IBM makes its disk arrays work together. PAGE 4

Another top exec is out at PeopleSoft. PAGE 12

Former CA CEO Sanjay Kumar surfaces at a conference in France. PAGE 16

COMPUTERWORLD

THE VOICE OF IT MANAGEMENT • WWW.COMPUTERWORLD.COM

OCTOBER 18, 2004 • VOL. 38 • NO. 42 • $5/COPY

Users Buoyed By Monthly Patch Releases

Microsoft's approach makes process more predictable, execs say

BY JAIKUMAR VIJAYAN

Microsoft Corp.'s move to a monthly patch-release cycle one year ago this month has made it easier to install security updates for Windows and other products, IT managers said last week — even as they were greeted with a barrage of new fixes, many for flaws that were given "critical" severity ratings by Microsoft.

The October patch rollout was one of Microsoft's largest this year, consisting of 10 patches designed to address a total of 20 vulnerabilities across a wide range of the company's products. Seven of the security updates were rated as "critical" for users to install, and the other three were labeled "important."

ADDITIONAL COVERAGE

For more stories about security technologies and issues, visit our Knowledge Center online:

QuickLink k1600
www.computerworld.com

Security Updates

The "critical" patches released by Microsoft last week include:

MS04-032: Fixes several security holes in Windows NT, XP and Server 2003 that could allow attackers to take complete control of unprotected systems and view, change or delete data on compromised machines.

MS04-033: Patches a remote code execution vulnerability in several versions of Excel for Windows and Macintosh systems.

MS04-034: Addresses a flaw in the way that Windows XP and Server 2003 process compressed files.

The massive release highlighted Microsoft's continuing struggles with software security. Nevertheless, six users said the monthly cycle that the vendor has followed for almost all the patches released since last October has made the patching process more predictable and manageable.

"Overall, the [monthly patching] schedule is a good thing," said Hugh McArthur, information systems security officer at Online Resources Corp., an online bill-processing company in McLean, Va. "It has been helpful for planning purposes and in allowing us to evaluate the patches once a month, versus having

Patches, page 55

IT Scrambles to Meet Sarb-Ox Controls Deadline

Slow starts, miscommunication put companies under the gun on technology-related mandates

BY THOMAS HOFFMAN

IT departments at many large companies are racing to document, remediate and test IT-related controls to meet a year-end reporting deadline for Sarbanes-Oxley compliance.

ONLINE
Read more Sarbanes-Oxley news on our Web site:
QuickLink a3250

The rush is on because many companies failed to grasp the amount of work that would be required and because of miscommunication between IT managers and the finance departments that typically run Sarbanes-Oxley Act compliance projects, according to users and analysts who were interviewed last week.

"What I've seen is a 'Let's drop everything and get this done' approach on dealing with IT controls from the second quarter until now," said John Hagerty, an analyst at AMR Research Inc. in Boston.

Hagerty and several other analysts and consultants said they expect that most companies that need to show Sarb-Ox compliance by year's end will get the bulk of their IT controls documented and tested in time. But some analysts predicted that in annual 10-K reports early next year, as many as 25% of the so-called accelerated filers will have to report controls-related exceptions that require additional remediation. Depending on the severity of the problems, companies could be fined by the U.S. Securities and Exchange Commission.

Sarb-Ox, page 16

KNOWLEDGE CENTER STORAGE

Stretching Your Storage Dollars

SPECIAL REPORT

Demand for data storage is far outpacing the growth of IT budgets, so something has to give. This special report identifies cost-saving strategies to help you cope. **Stories begin on page 35.**

ONLINE Exclusive results from *Computerworld*'s storage survey, in downloadable PowerPoint slides. QuickLink 49486

BILLY MILLOR

NEWSPAPER

$BXBBJFT**********CAR-RT LOT*MB-052
#0234939/CB/0# CW2004420 002 5832
83 #

PROQUEST
PO BOX 984 24-6
ANN ARBOR MI 48106-0984

Microsoft

Your potential. Our passion.™

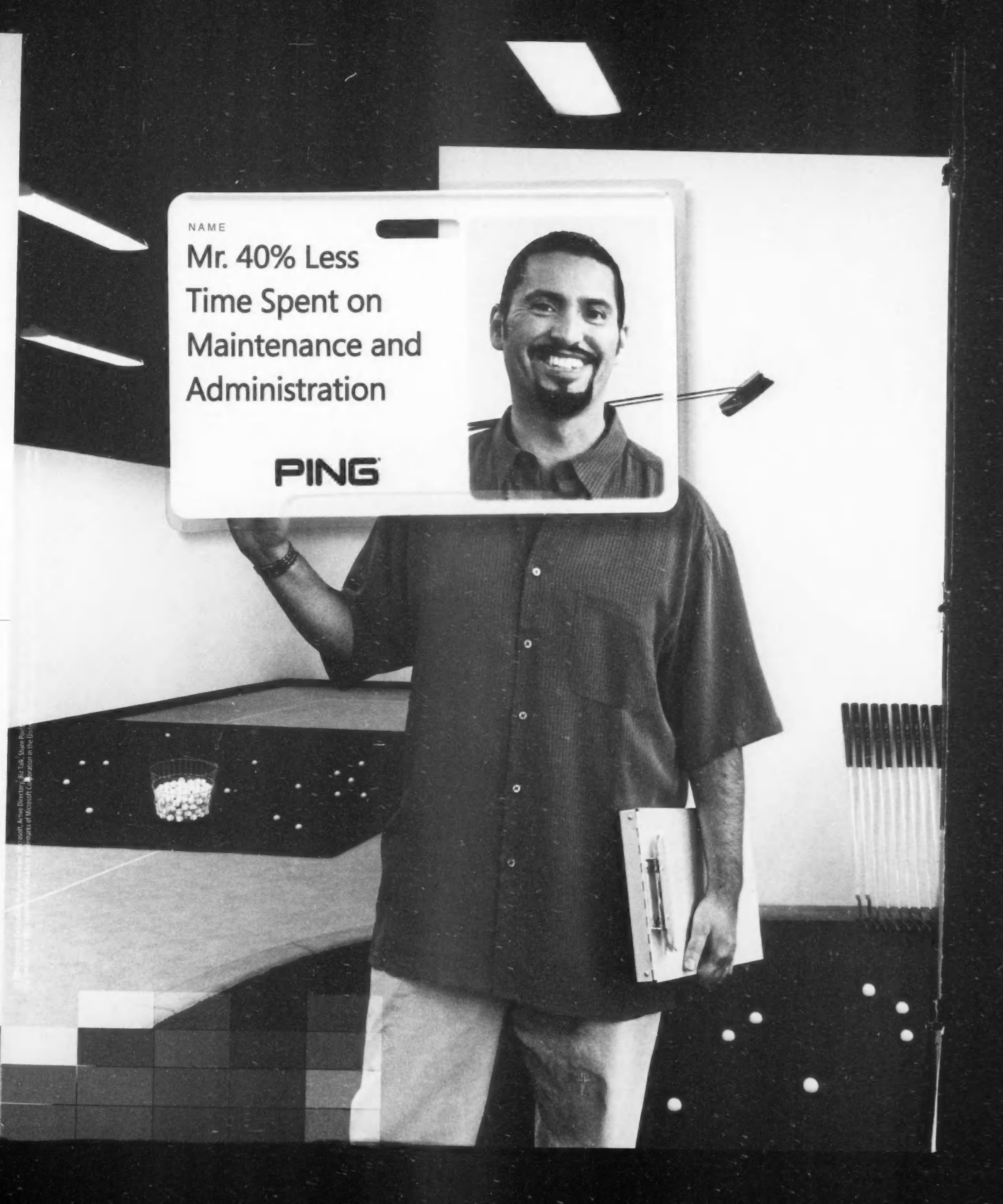
"Instead of putting out fires, we now focus on ways we can deploy new technologies that benefit our customer service."

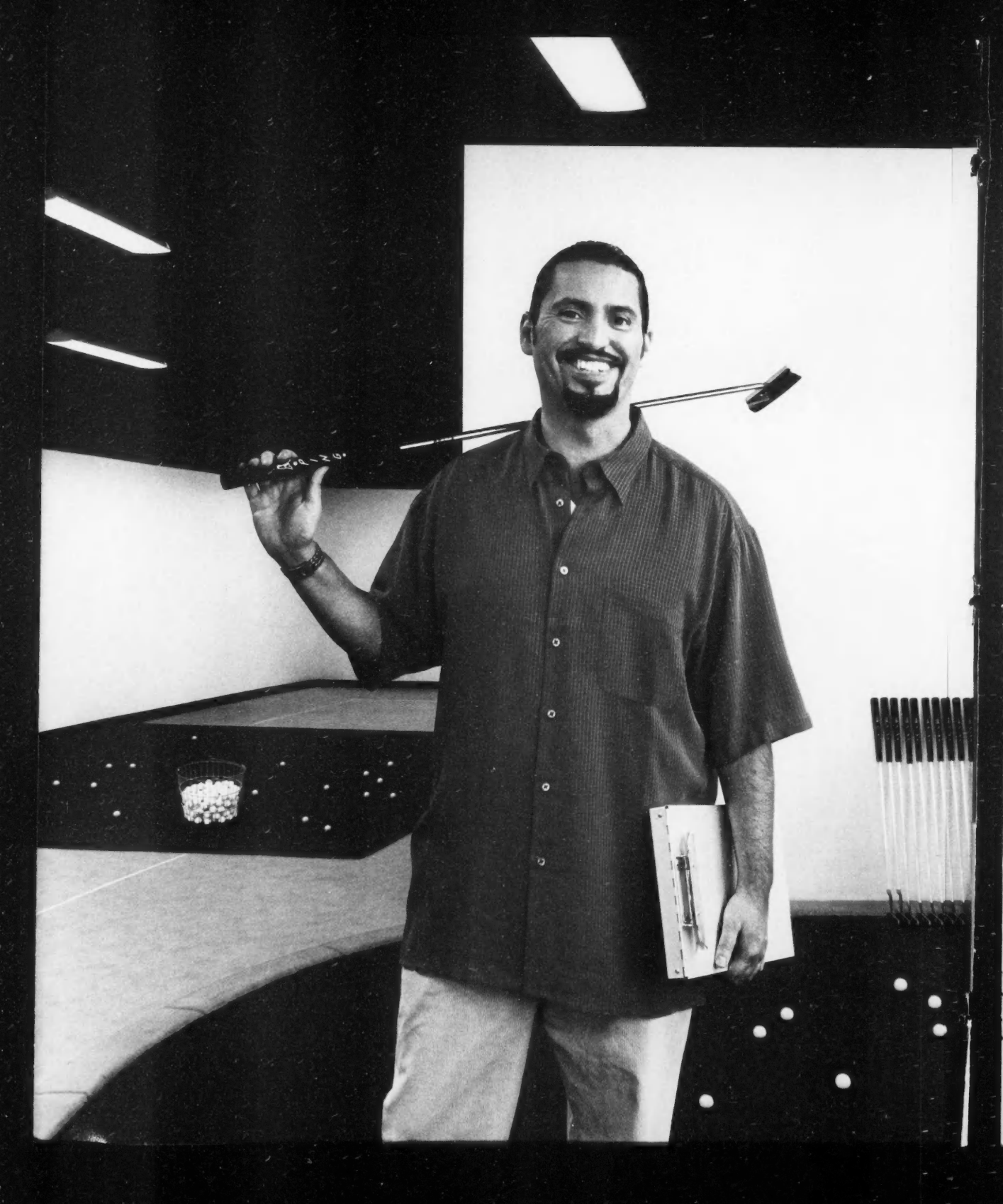
Dave Chacon
Manager, Technical Services, *PING*

Microsoft Windows Server System makes it easier for golf club maker PING to manage the infrastructure serving their 400 end users. Here's how: By using Windows Server 2003 with Active Directory,® PING now centrally manages all its servers, desktops, and end users from one location. This cut annual administrative time by 800 hours. Time that can now be spent developing new ways to support customers, partners, and employees. Software that's easier to manage is software that helps you do more with less. Get the full PING story at **microsoft.com/wssystem**

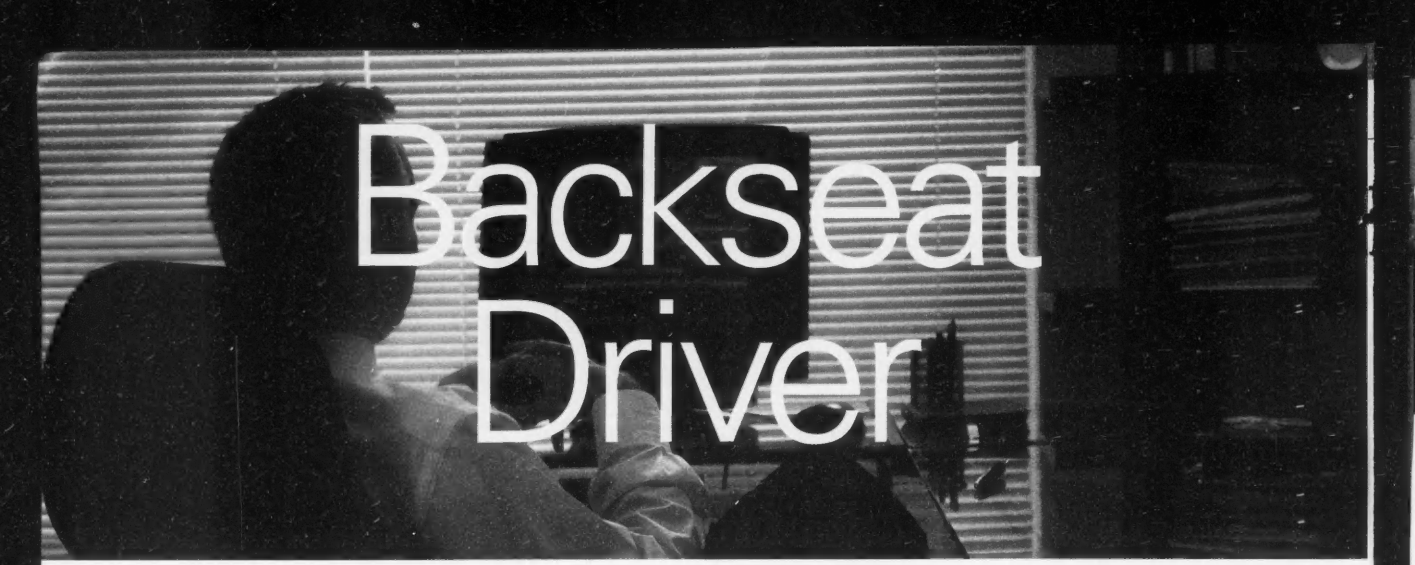
Windows Server System™ includes:

Server OS	Windows Server™
Operations Infrastructure	Systems Management Server
	Operations Manager
	Internet Security & Acceleration Server
	Windows® Storage Server
Application Infrastructure	SQL Server™
	BizTalk® Server
	Commerce Server
	Host Integration Server
Information Work Infrastructure	Exchange Server
	Content Management Server
	Office SharePoint™ Portal Server
	Office Live Communications Server


NAME
Mr. 40% Less
Time Spent on
Maintenance and
Administration
PING



Make a name for yourself
with Windows Server System.
Microsoft
Windows
Server System



The right storage solution doesn't just give you better storage control. It helps you make better business decisions.

Storage Management Solutions

The first step in making better business decisions? Deciding to be in control. CA's Intelligent Storage Management solutions can put you in control of costs, resources and data availability like never before. They provide you with a comprehensive real-time view of your system's storage capabilities, while also providing immediate access to all of your information. As a result, you can manage and monitor your entire storage environment with ease and actually use existing data. As always, it's also vendor- and device-neutral, so you can maximize your current storage resources, saving time and money. With more automated software that can make its own decisions about storage management, you'll have the information you need to make better business decisions. To find out more or to get a white paper, go to ca.com/driver.

ca Computer Associates®

© 2004 Computer Associates International, Inc. (CA)

CONTENTS

10.18.04

E-vote at Risk
In the Technology section: Despite assurances from election officials and vendors, researchers say the the security and reliability of electronic voting systems is in doubt because of substandard development and testing practices. **Page 25**

The Extra Mile
In the Management section: Rebuilding your bare-bones IT shop? It's a great time to commit to getting diversity right. Here are some practical tips from companies that know how. **Page 31**

NEWS

4 **IBM's new** storage arrays offer many firsts, including compatibility between arrays.

4 **Starbucks customers** can now use HP tablet PCs to burn music CDs while sipping their coffee.

5 **IBM and Borland add tools** that bring business process automation to software development.

8 **India's IT hiring boom** continues, and the growing demand for offshore services could lead to rate increases.

10 **IBM completes** its Power5 lineup by adding 64-way pSeries and iSeries models.

12 **The L.A. city government's** second rollout of PeopleSoft apps is proceeding a lot more smoothly than the first one.

12 **PeopleSoft's management** shuffle continues as executive VP Ram Gupta departs.

16 **Sanjay Kumar looks for** start-ups to invest in after his exit from Computer Associates.

ONLINE

ONLINE DEPARTMENTS

Breaking News
QuickLink a1510

Newsletter Subscriptions
QuickLink a1430

Knowledge Centers
QuickLink a2570

Computerworld Store
QuickLink a2420

What's a QuickLink?
On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Web site. Just enter that code into our QuickLink box, which you'll see at the top of each page on our site.

OPINIONS

6 On the Mark: **Mark Hall** has the latest on Teradata's plans to better integrate its data warehouse with other apps.

20 **Don Tennant** is still waiting for something substantive to come out of the accord Sun and Microsoft signed in April.

20 **Michael Gartenberg** has heard it all before when it comes to scary stories about the security threats posed by USB devices.

21 **Virginia Robbins** loves self-service, but automation can do only so much before it becomes more cost-effective to have humans intervene.

28 **Robert L. Mitchell** thinks companies are missing the point if they dislike how quickly information (about their products' flaws, for example) is disseminated on the Web.

34 **Barbara Gomolski** realizes that IT careers have lost their allure for many, but if you've got a budding techie at home, she has some advice.

56 Frankly Speaking: **Frank Hayes** says that while you might want to jam wireless transmissions in your offices, you can't jam the future.

DEPARTMENTS/RESOURCES

At Deadline Briefs 4
News Briefs 6, 10
Letters 21
IT Careers 49
Company Index 54
How to Contact CW 54
Shark Tank 56

KNOWLEDGE CENTER STORAGE

Stretching Your Storage Dollars

Skyrocketing demand for data storage is outpacing the growth of IT budgets, and something has to give. This special report identifies cost-saving strategies to help you cope.

SPECIAL REPORT

PACKAGE BEGINS ON PAGE 35.

36 Thrifty Storage Strategies. To maximize storage savings, some larger companies are homing in on long-term planning initiatives.

38 Long Distance, Short Money. IT execs like Don Bolton of Teppco Partners say they're cutting their long-distance data backup costs with storage-over-IP technology.

40 Secondhand Savings. Buying used storage equipment is cheaper than buying new, and customers can also reap the benefits of faster acquisition cycles and more flexible maintenance programs. But there are risks involved.

44 QuickStudy: A primer on grid storage, a model similar to grid computing that allows companies to deploy and manage storage distributed across multiple systems and networks. **ONLINE:** Learn more about the first grid storage product. QuickLink 49972

45 The Almanac. E-mail, business intelligence and CRM are driving forces behind the need for more storage capacity; e-mail archiving has hidden costs; and a prototype holographic disc is emerging from an R&D lab.

46 Opinion: Columnist Mark Hall was planning to write about the impending demise of tape. But then he looked a bit closer and discovered it has a bright future.

WWW.COMPUTERWORLD.COM

Editor's Picks: A collection of *Computerworld*'s best stories about data storage, including regulatory compliance issues. QuickLink 49977

Data Points. Our newest collection has storage factoids to download for your PowerPoint presentations. QuickLink 49486

Storage Networking World Highlights. News and survey results from *Computerworld*'s twice-annual storage conference. QuickLink 49510

AT DEADLINE

Cisco, Microsoft Bridge Security Gap

CISCO SYSTEMS INC. and **MICROSOFT CORP.** today will announce a collaborative effort designed to bridge a divide between their emerging network access-control architectures.

The two companies said on Friday that they have agreed to share application programming interfaces and jointly develop protocols intended to improve interoperability between Microsoft's Network Access Protection technology and Cisco's rival Network Admission Control offering.

NAP and NAC are designed to help companies enforce security policies on network endpoint systems such as PCs and mobile devices. The technologies let IT managers set rules that prevent a client device from accessing a network unless it complies with policies on antivirus software updates, firewall configurations and other issues.

But Cisco's plan is to integrate the functionality into its routers, switches and virtual private network devices, while Microsoft's strategy is focused on embedding NAP in its operating systems.

The agreement to collaborate means that users shouldn't have to worry about interoperability issues, said Joel Conover, an analyst at Current Analysis Inc. in Sterling, Va. "Microsoft and Cisco needed to do this," he said. "A lack of cooperation would have resulted in competing standards or no standards at all, both of which are unattractive to enterprises."

Cisco released an initial set of NAC products in June [QuickLink 47781]. Microsoft will add VPN Quarantine support in the first service pack for Windows Server 2003, due by mid-2005. But Steve Anderson, director of networking in Microsoft's Windows Server group, said full NAP support won't come until the Longhorn version of Windows, expected in 2007.

Microsoft had planned to fully support NAP in an update to Windows Server 2003 that's due in the second half of 2005. Anderson said the delay is being caused by the deal with Cisco and a decision by Microsoft to add IPsec enforcement in addition to Dynamic Host Configuration Protocol enforcement.

– Jaikumar Vijayan and Carol Sliwa

IBM Adds High-End, Midrange Disk Arrays

Performance, capacity boosted in first storage systems based on IBM chips

BY LUCAS MEARIAN
NEW YORK

IBM LAST WEEK unveiled two new enterprise-class disk arrays. One is aimed at the high end and one at midrange environments, but both have compatible software that allows the boxes to be managed through a single interface and data to be replicated between them.

The TotalStorage DS8000, the next generation of IBM's high-end Enterprise Storage Server, also known as the Shark, boosts performance as much as sixfold, and the 192TB capacity is more than three times that of its predecessor. The midrange TotalStorage DS6000 array is a rack-mountable, 3U-high unit that scales from 580GB to 67.2TB. (1U is 1.75-in. high.)

Both boxes represent the first time IBM has used native Fibre Channel disk drives instead of SCSI with Fibre Channel bridges. Charles Lickel, vice president of software and storage development at IBM, said the arrays will be offered with less-expensive Advanced Technology Attachment disks by the end of 2005.

The arrays will ship Dec. 3. The DS8000 and DS6000 can be used as primary storage for IBM zSeries and iSeries mainframes as well as for Unix, Linux and Wintel servers. The DS8000 can be upgraded on the fly from two to four processors.

For the first time, IBM used its own server processors for storage. The refrigerator-size DS8000 uses the pSeries processor, and the DS6000 uses an IBM PowerPC chip.

Compatibility a Plus

Users at a press event here said they were impressed by the increase in performance and the ability to use a single management platform across all of IBM's storage products.

"It's easy to talk about the new stuff, but when you've got an existing infrastructure, you've got to have something that blends into that," said Bob Venable, manager of enterprise systems at BlueCross BlueShield of Tennessee Inc. in Chattanooga. The users also said they looked forward to an upgrade that, as with a mainframe, will allow multiple logical partitions to be created automatically in response to application needs. IBM pledged to add that capability over the next year.

Currently the DS8000 can be manually split into two separate systems.

Tony Asaro, an analyst at Enterprise Strategy Group Inc. in Milford, Mass., gave the new IBM disk arrays high marks for their price, compatibility, four-year warranty and use of IBM-built processors. But he added that IBM must still address the network-attached storage and content-addressed storage markets, like chief competitors EMC Corp. and Hitachi Data Systems Corp. have.

Both arrays use an internally switched architecture instead of Fibre Channel arbitrated loop, which brings IBM up to speed with similar boxes from its major competitors.

Dale Collier, senior vice president of technology at Regions Financial Corp. in Montgomery, Ala., said he likes the compatibility between the DS8000 and DS6000. He's considering buying both to replicate between a data center in Montgomery and a secondary one in Birmingham, Ala. Regions' infrastructure includes IBM mainframes and Shark arrays and EMC's high-end Symmetrix arrays.

"Today, we're dealing with SunGard for disaster recovery, and at best that's a 24-hour [recovery time objective]," Collier said. By replicating the DS8000 and DS6000 between data centers, he could recover data in seconds, he said.

John Dick, CIO at Regions Financial, said he likes the new arrays but added that the technology also offers him a chance to get older-model Shark arrays at a cut-rate price. **50078**

IBM Storage Arrays

IBM DS8000

- Retail starting price: $134,000
- 256GB of cache
- Supports 96 petabytes of external storage
- 128 Fibre Channel or Ficon ports
- In 2005, will be expandable from two to eight processors and 512GB of cache

DS6000 (PICTURED ABOVE)

- Retail starting price: $97,000
- Configured through Web-based interfaces
- 4GB of cache
- 16 Fibre Channel or Ficon ports

Starbucks Taps HP for Music Download Service

STARBUCKS CORP. last week said it will use hardware and software from Hewlett-Packard Co. to serve up a vast digital library of songs to customers along with its coffee.

Starbucks customers will be able to use tablet PCs supplied by HP to listen to songs, download them and burn them onto CDs.

A nationwide launch of the new setup, which Starbucks is calling its Hear Music "media bar," is scheduled to begin today at 15 outlets in Seattle and will expand to 30 coffee shops in the Austin area starting next Monday.

←Starbucks is installing HP tablet PCs, workstations and printers to support its new in-store music-download and CD-burning service.

Vendors Upgrade Development Tools

IBM, Borland aim to bring business process automation to app design work

BY HEATHER HAVENSTEIN

IBM and Borland Software Corp. last week separately brought out upgrades to their development tool lines that executives said add support for heterogeneous environments and more closely link software creation to business goals.

IBM unveiled an expanded Rational Software product line that it had previewed under the code name Atlantic at the annual Rational user group conference last summer [QuickLink 48365]. Meanwhile, Borland rolled out a new version of its long-running Delphi Windows development tool family. Observers said both companies are maneuvering to infuse their platforms with business process automation commonly used in other corporate operations such as core product design and manufacturing.

"What we're seeing today in IT shops is the need to [start] thinking more strategically about IT priorities and how the overall IT assets and resources can be best matched to deliver business value," said Melissa Webster, an analyst at market research company IDC.

IBM's release of the Rational tool set brings all the offerings into the Eclipse 3.0 framework, an open-source development platform that promises deeper integration of the various products, Webster said. Eclipse replaces proprietary application programming interfaces previously used to integrate the Rational tools.

The Rational tools lineup includes Portfolio Manager, Software Architect, Software Modeler and Manual Tester.

The modeling tool includes support for Unified Modeling Language 2.0 for visual-based modeling. IBM will continue supporting the older Rational Rose and Rational XDE modeling systems.

IBM will acquire the portfolio management software through its planned purchase of Systemcorp ALG Ltd. (see story, below right).

New Products and Enhancements

IBM RATIONAL

- All Rational development tools will be based on the Eclipse 3.0 development framework.
- New products include Portfolio Manager, Software Architect and Software Modeler.
- New features in the tools are designed to support both Java and .Net developers.

BORLAND DELPHI 2005

- Supports Win32, .Net and C#.
- Integrates with Borland application life-cycle management tools designed to simplify code management and support developer team collaboration.

Diamondback Strikes

Meanwhile, Borland this week unveiled Delphi 2005, which incorporates support for .Net Win32, Delphi and C# in one environment while integrating with Borland application life-cycle management tools.

Code-named Diamondback, Delphi 2005 supports Borland's Software Delivery Optimization plan to apply business process automation to software development tools, the company said.

Delphi 2005 also provides an alternative to the end-to-end development platforms from IBM and Microsoft Corp., said Gartner Inc. analyst Mark Driver. Many IT managers with systems from both Microsoft and IBM contend that recurring features in multivendor tools complicate development projects, he said.

"Borland is one of the very few pure tools vendors of any serious size left in the industry, [and] they have to play both sides of the fence," Driver said.

Omar Sayed, CEO of Succeed Corp. in Chandler, Ariz., has used Delphi to build e-commerce systems for his customers to store data and operate online auctions. The new features — especially support for Win32, .Net and C# in one environment — will give company developers "more scope to what they can do without having to go outside and bridge things in different environments," he said.

Delphi 2005 is slated to ship next month. The Architect Edition is priced at $3,000 for new users and $1,999 for an upgrade, while the Enterprise Edition lists at $2,500 for new users and $1,500 for an upgrade. The Professional Edition is priced at $999 for new users and $399 for an upgrade.

All of the new IBM products will be available by year's end. Pricing ranges from $5,500 per user for Rational Software Architect to $1,000 per user for the IBM Rational Web Developer for WebSphere. **50105**

MORE ONLINE

For more on this topic, visit our Development Knowledge Center:
QuickLink a3110
www.computerworld.com

IBM to Buy Systemcorp To Bolster Rational Line

IBM last week agreed to acquire Systemcorp ALG Ltd., a Montreal-based project portfolio management company, as part of a strategy of pushing business process-driven software development.

IBM plans to fold Systemcorp's Web-based PMOffice software into its Rational development platform as Rational Portfolio Manager. The portfolio manager tool can provide a comprehensive view of IT projects across the enterprise, tracking all project deliverables, such as budgets and tasks, until the work is completed, IBM said.

Financial terms of the deal weren't disclosed.

Systemcorp's software can provide Rational users the visibility needed to more effectively manage IT investments, said Roger Oberg, IBM's vice president of marketing for Rational products.

"Software development isn't a discrete set of activities done by testers and developers and architects in isolation, but is a business process . . . that lends itself to automation and integration," Oberg said. "All of the software development investment decisions take place in the broader context of an IT portfolio management decision."

The Systemcorp technology, built using IBM's WebSphere Portal, was designed to complement IBM middleware, Oberg added.

The tool can help CIOs effectively communicate how IT resources are deployed to respond to overarching business priorities, said Melissa Webster, an analyst at market research company IDC. Because the tool tracks costs and other expenses against project milestones, it can link developer teams to the business goals, she added.

"A few years ago, those discussions were held on a rather technical level," Webster said. "It was hard for the lines-of-business people to gain some visibility as to what the issues were when the business priorities change . . . or when projects were delayed, why they were delayed."

– *Heather Havenstein*

Starbucks has made the HP Tablet PC TC1100 systems more durable by adding an aluminum frame and stronger cables for the headsets, said James Snook, vice president of technology strategy and innovation at the Seattle-based company. He added that touch-screen technology eliminates the need for a keyboard.

"We found a way to complement the existing store environment without changing it to a significant extent," Snook said. Using a custom application on the tablet PCs, customers sitting at a music bar or in nearby chairs will be able to view a directory and hear selections from an in-store database of more than 150,000 songs.

An HP xw4100 workstation will store the songs and support the creation of professional-quality music CDs, while an HP Business InkJet 9670 printer will allow customers to produce personalized CD covers, inserts, graphics and packaging, said Marc Kriz, HP's worldwide alliance manager for Starbucks.

Starbucks plans to charge $8.99 for the first seven songs and 99 cents for each additional one. Credit card data for processing payments will be sent from the tablet PCs to the company's point-of-sale system via in-store Wi-Fi networks.

HP and Starbucks wouldn't disclose the expected cost of the technology deployment.

Snook said the rollout will take years to complete but wasn't more specific.

– *Matt Hamblen*

BRIEFS

Novell Will Defend Open-Source

Novell Inc. said it's prepared to use its patent portfolio to protect its open-source software against lawsuits. The company vowed to employ "the same measures generally used to defend proprietary software products" if other vendors claim that its open-source offerings infringe on their patents. Novell didn't promise that it would never use its patents against other Linux vendors but said that it has no intention of doing so.

SCO to State Case On New Web Site

The SCO Group Inc. said it plans on Nov. 1 to launch a Web site devoted to its legal battles with Novell and other Linux backers. The *www.prosco.net* site will let SCO "tell our side of the story," CEO Darl McBride said at the ETRE conference in Cannes, France. A spokesman for Lindon, Utah-based SCO said the site is being created partly in response to *www.groklaw.net*, an independent Web site that has been critical of SCO.

Cisco Inks Security Deals With CA, IBM

Computer Associates International Inc. said it plans to integrate its antivirus and antispyware tools with Cisco Systems Inc.'s Trust Agent software. Trust Agent, which is part of Cisco's Network Admission Control offering, works with NAC-enabled routers to stop unsecured PCs from accessing networks. Separately, Cisco and IBM said that IBM's Tivoli management software now interoperates with the NAC products.

Short Takes

WAL-MART STORES INC. said it has expanded its data warehouse, which is based on NCR Corp.'s Teradata software. But it didn't disclose any details. (See related items at right.) . . . SAP AG upgraded its business applications for small and midsize companies.

ON THE MARK

HOT TECHNOLOGY TRENDS, NEW PRODUCT NEWS AND INDUSTRY GOSSIP BY MARK HALL

MATTHEW FAULKNER

Orange Everywhere in October? Must Be . . .

. . . Halloween? Or maybe the Syracuse University Orangemen football team had arrived in Seattle to battle the University of Washington Huskies? Neither. The Washington State Convention and Trade Center was mobbed last week by 3,000 database and business intelligence (BI) wizards festooned with orange vests, hats, shirts and even shoes. Many also carried orange travel bags, backpacks and briefcases — not necessarily to display their questionable fashion sense, but to show their colors while attending Teradata's annual user conference. The San Diego-based data warehousing division of NCR Corp. has adopted orange as its corporate color. In addition to doing brisk business in orange clothing and tchotchkes, the company gave users a sneak peek at Teradata Warehouse 8.0, a software upgrade that's due in early December. According to Alan Chow, Teradata's senior vice president for R&D, the new release will conform to Web services and message-passing architectures, linking it more tightly with business applications. Perhaps more important, he says, 8.0 makes it easier to trigger external stored procedures so other applications can automatically react to BI discovered inside a Teradata data warehouse. Chow also brags that 8.0 improves the responsiveness of data warehouses to real-time rates.

CHOW: Teradata improves responsiveness to real time.

Near real-time analytics helped boost . . .

. . . Continental Airlines Inc. from worst to first. That's the opinion of Kelly Cook, director of customer relationship management at the Houston-based airline. Cook claims that BI that Continental gleaned from its customers helped move it from last place in travelers' opinions nine years ago to the winner of this year's award for best airline from London-based OAG Worldwide Ltd. The first move Continental made to improve frequent-flier relations back in the mid-'90s was to consolidate 55 databases worldwide into a single Teradata data warehouse. "We wanted one voice of the customer," Cook says. Next, the goal was to identify high-yield customers, create loyalty programs and get more immediate data on the cost of each flight. For example, flight attendants now receive information from the data warehouse about high-value customers on a flight so they can personally express the airline's interest in and knowledge about the customers' recent flying experiences with Continental. And the company's financial analysts can get information about the profitability of each flight instantly after "wheels up," Cook says. She adds that in the future, she wants the data warehouse to use real-time clickstream data to automatically generate targeted offers to Continental's Web site visitors.

Data warehouse cuts costs for . . .

. . . cost-conscious Southwest Airlines Co. The Dallas-based carrier centralized its BI group two years ago around a Teradata data warehouse in order to keep a lid on IT costs through better systems management and more efficient staffing policies. "We're the low-cost airline, so we should have a low-cost infrastructure," says Patrick Bolin, senior manager of enterprise data warehousing at Southwest. Besides helping to hold down IT spending, the 2TB data warehouse helps business analysts cut corporate costs. Bolin pegs the annual savings from ideas generated through use of the data warehouse at between $1.2 million and $1.4 million. As a result of that success, the data warehouse is destined to grow. Bolin estimates that it will increase to 3TB by next summer and possibly double that volume by 2007. He says his team is developing better ways of handling ad hoc query requests from end users and creating dashboard-style tools for the airline's executives.

BOLIN says BI cuts costs.

'Extreme data warehousing' is . . .

. . . just around the corner, predicts Stephen Brobst, Teradata's chief technology officer. The "extreme" future that Brobst envisions for data warehouse managers has three drivers: vast increases in data volume, demand for real-time responsiveness and hordes of new users. Brobst points to potential petabytes of data created by RFID technology. Companies that use RFID had better be prepared to harvest data at rates "two orders of magnitude greater" than they're used to getting, he says. Data warehouse performance will also be critical for BI apps, according to Brobst. A data warehouse that can't index new information "instantaneously or near instantaneously" is going to be all but useless in the coming years, Brobst claims. He adds that CEOs who want their companies to become responsive "real-time organizations" are foolish if they leave out BI. "A real-time enterprise without real-time business intelligence is a real fast, dumb organization," he quips. Finally, Brobst estimates that the number of BI users of a typical data warehouse will leap by a factor of 10 in the next few years. Just to make sure it could handle the load, Teradata last year increased the number of users who can access its data warehouse by a factor of more than 100,000. That should do it. **50060**

4.2B
Potential users of a single Teradata data warehouse

HP Integrity servers are taking off, as are the companies using them.

Companies adopting HP Integrity servers, powered by industry-leading Intel® Itanium® 2 Processors, are seeing remarkable gains in performance. The momentum is building. One after another, companies are choosing HP Integrity servers. Leading software and technology partners such as BEA, Microsoft,® Oracle, SAP and Siebel Systems have embraced the platform as an industry standard. And with the ability to manage a mixed environment of UNIX, Microsoft® Windows,® Linux and OpenVMS, HP Integrity servers are fast becoming the ultimate consolidation tool. Demand maximum performance, reliability and cost-efficiency now, on a platform that will carry you forward into the future. Demand performance that's real-world proven, and get it—with HP Integrity server solutions.

Choosing HP Integrity servers, choosing results.

AIRBUS UK:

Running HP-UX11i on HP Integrity servers, 20–30 wing design simulations that used to take weeks are now done overnight.

COMPUSA:

Going with 64-bit architecture using HP Integrity servers, they cut access time to inventory data by up to 85%.

FIAT AUTO:

Standardizing on 64-bit infrastructure using HP Integrity servers, they're integrating and enhancing sales and service as well as streamlining the buying process while lowering sales cost.

THE KOEHLER GROUP:

Moving to an environment composed of HP Integrity servers, they gained a 50% improvement in mission-critical performance.

hp invent

To get the IDC white paper outlining the performance of HP Integrity servers with Intel® Itanium® 2 Processors,

CALL	**1-800-282-6672** option 5, mention code AQHF
CLICK	**hp.com/go/demandintegrity5**

intel inside ITANIUM 2

Intel, Intel Inside, the Intel Inside Logo and Itanium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation.
©2004 Hewlett-Packard Development Company, L.P.

Offshoring Fuels IT Hiring Boom in India

Cost of services could increase as demand, wages rise

BY PATRICK THIBODEAU

IN QUARTERLY financial-results reports released last week, offshore outsourcing firms in India detailed sharp increases in employee head count. But analysts said the growing demand for offshore services and workers is increasing wages in India, raising the potential of rate increases for U.S. customers.

For now, at least, competition in India is keeping billing rates stable. But several analysts predicted that the current situation won't continue indefinitely because competition for experienced employees will increase.

During the quarter that ended Sept. 30, Infosys Technologies Ltd.'s workforce grew from 27,939 to 32,949 — an 18% increase in just three months. At the end of last year's third quarter, Bangalore-based Infosys had 18,580 employees.

Mumbai-based Tata Consultancy Services Ltd. said its head count climbed nearly 12% in this year's third quarter, from 36,636 to 40,948. In June 2003, Tata employed about 24,000 people.

"Bangalore today is like Silicon Valley was five years ago," said Lance Travis, an analyst at Boston-based AMR Research Inc.

The growth in overseas IT employment stems from rising demand for offshore services from U.S. companies, according to Meta Group Inc. Meta estimates that offshore spending by U.S. businesses will reach $10 billion this year and that the use of offshore services will grow about 20% annually through 2008. And that's with more than half of all companies not yet using any offshore services, said Meta analyst Dane Anderson (see chart).

Offshore demand is expected to drive up salaries in India by about 14% this year, especially for experienced workers, said Eugene Kublanov, an analyst at outsourcing consulting firm NeoIT Inc. in San Ramon, Calif. The increases are likely to continue at a similar pace, Kublanov added. An experienced Indian programmer making $7,400 this year can expect to earn about $8,500 in 2005, he said, noting that the same employee may be making twice that amount by 2010.

To cover such increases, offshore vendors will have to become more efficient and add more-sophisticated IT services so they can charge higher prices. Kublanov said that although application development rates in India remain roughly one-third of what they are in the U.S., the costs there are creeping to $19 to $20 per hour this year, compared with $17 to $18 in 2003.

Competition for employees, as well as the threat of increasing turnover, is prompting some companies to try different approaches to recruiting and retaining workers.

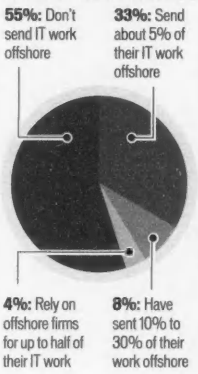
At its offshore outsourcing facility in Hyderabad, Sierra Atlantic Inc. has begun holding "parents day" gatherings for recent college graduates who are considering job offers. The Fremont, Calif.-based company hopes that winning over the parents of potential new hires will increase the likelihood that its job offers will be accepted.

"The majority of college graduates have arranged marriages still," said Marc Hebert, a vice president at Sierra Atlantic. "The parents are very involved in these kids' lives."

Hebert said that in Hyderabad, where Sierra Atlantic has a 700-employee facility, annual turnover has reached about 15%, putting it on par with other large cities in India. The accelerating demand for workers is prompting Sierra Atlantic to consider setting up operations in other regions of India, as well as in countries such as China, he said. 50111

Offshoring Usage

Meta Group's breakdown of offshore outsourcing usage by U.S. companies, based on an analysis of its client base:



Correction

A STORY ABOUT e-mail security appliances that ran in last week's News section ("Vendors Add Weapons to Battle E-mail Viruses") incorrectly listed the amount of venture capital funding raised by Avinti Inc. The Lindon, Utah-based company has raised about $3 million in financing thus far.

BMC Integrates Tools for IT, Business Management

BY MATT HAMBLEN

BMC Software Inc. last week announced plans to integrate a variety of its systems management tools with a product that lets users track how IT problems affect individual business processes.

Houston-based BMC said an upgrade of its Service Impact Manager software will include links to products such as the company's mainframe and DB2 database management tools and its Remedy help desk and asset management tools. Service Impact Manager 5.0, which is due in December, will also include a built-in configuration management database and other new features (see box).

The upgrade is aimed at broadening BMC's Business Service Management (BSM) offering, which is designed to give IT managers a set of tools for linking computing resources to business priorities.

Peter Armstrong, director of corporate strategy at BMC, said that in addition to the internal product integration capabilities, the BSM software can interoperate with rival management tools such as Hewlett-Packard Co.'s OpenView and Computer Associates International Inc.'s Unicenter. Users who install Service Impact Manager "don't have to rip out their existing products," Armstrong said.

OTHER FEATURES

Service Impact Manager 5.0

- A Web-based software portal that provides system status information and customizable dashboard views
- Reporting tools based on technology from Business Objects SA
- A graphical tool that lets multiple users jointly develop business service models
- Integration with an IT asset discovery tool that shows the relationships between systems and applications

Joe Furmanski, technology project director at the University of Pittsburgh Medical Center, said he's testing Service Impact Manager 5.0 for use in monitoring the center's E-Health system, which is used to order medications, manage surgeries and provide patient information to doctors and other employees.

The E-Health system is based on applications developed by Kansas City, Mo.-based Cerner Corp. and is being rolled out at 20 medical facilities in western Pennsylvania as part of a 10-year, $130 million project.

Service Impact Manager is expected to help IT staffers keep the system running around the clock and provide information to business managers when technical problems do occur, Furmanski said.

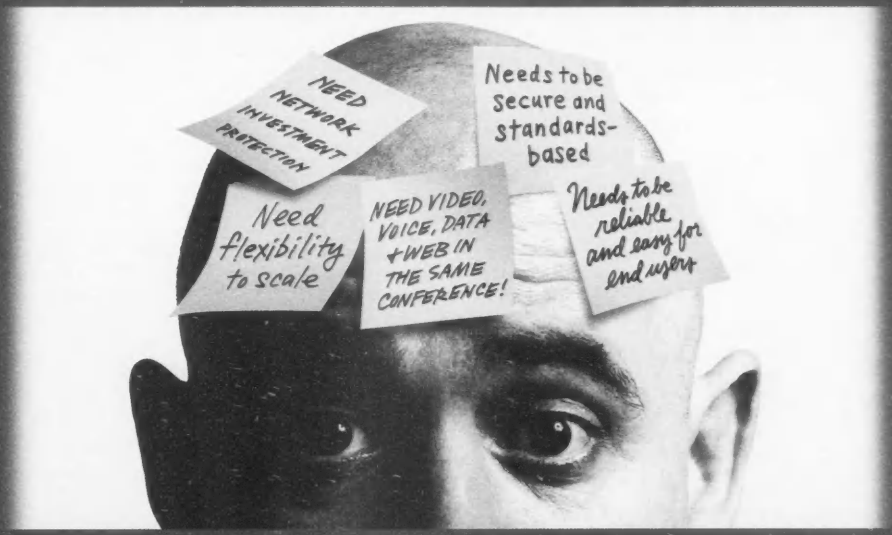
The medical center chose BMC over other vendors primarily because of an existing software integration partnership between BMC and Cerner, Furmanski said, adding that he expects to fully integrate Service Impact Manager with the E-Health system within three months.

The new capabilities in Service Impact Manager 5.0 will "make BMC's products more manageable in smaller bites," said Dennis Gaughan, an analyst at AMR Research Inc. in Boston. "BMC is trying to make the BSM concept not seem so daunting."

Tim Grieser, an analyst at IDC, agreed that the added ties between Service Impact Manager and other tools will be a big deal to IT managers. BMC "has discovered that IT does not want a rip-and-replace approach to products supporting the business impact of IT," Grieser said.

CA, HP and IBM's Tivoli Software unit have launched technology initiatives similar to BSM, but Grieser said BMC has moved more quickly to flesh out its offering than its competitors have. "BSM is a real thing and not a marketing position," he said. 50096

On-Demand Collaboration. Only from Polycom.



It'll take the demands off you.

In this real-time world, instant access to colleagues around the globe has become a business mandate. Only Polycom can bring people together via any combination of video, voice, data and Web collaboration – on-demand. Without complex IT intervention or advance reservations. A single dial-in number or buddy list securely connects any number of participants, over any network, any protocol, any speed or any collaboration device. And, you can do it all with confidence since Polycom has the most widely used unified solution in the world. It's really that simple. Isn't it time you demanded on-demand collaboration from Polycom?

Get a **free** copy of the **Unified Collaborative Communications whitepaper** at **www.polycom.com/ondemandcw** or call **1-877-POLYCOM**

VideoVoiceDataWeb

POLYCOM **Connect. Any Way You Want.**

©2004 Polycom, Inc. All rights reserved. Polycom and the Polycom logo are registered trademarks and the SoundStation industrial design is a trademark of Polycom, Inc. in the U.S. and various countries. All other trademarks are the property of their respective owners.

BRIEFS

Intel Shelves Plans For 4-GHz Pentium

Intel Corp. said it no longer plans to release a 4-GHz version of its Pentium 4 processor, having decided instead to realign its engineers around new priorities such as the development of multicore chips. The 4-GHz Pentium 4 originally was due by year's end but had been delayed until the first quarter of 2005. Intel said it will now also focus more on steps such as expanding the cache memory built into the processors.

Sun Reports Q1 Loss on Charges . . .

Sun Microsystems Inc. reported a loss for its first quarter, which ended Sept. 26. Sun said it would have had a $13 million profit if not for investment losses and restructuring and legal charges. Revenue was up 4% year over year but fell short of analysts' expectations.

SUN BY THE NUMBERS

	REVENUE	PROFIT
Q1 FY05	$2.63B	($174M)
Q1 FY04	$2.54B	($286M)

. . . And Ships JDS Suite for Solaris

Sun has released a version of its Java Desktop System software for the Solaris x86 operating system. The new release, which supports Sun's Opteron-based workstations, is the first version of the desktop software suite to run on Solaris instead of SUSE Linux. But some of the features that are in the Linux version aren't available in the first Solaris release.

Short Takes

MICROSOFT CORP. today plans to release an upgrade of its Navision business applications that's more tightly integrated with products such as Excel and SQL Server. . . . ORACLE CORP. urged users to apply database patches it issued in August, saying exploit code has been posted for some of the flaws.

IBM Adds 64-Way pSeries, iSeries

Targets server consolidation as Power5 achieves high-end performance levels

BY PATRICK THIBODEAU

IBM LAST WEEK completed its lineup of servers based on its Power5 chips by adding high-end pSeries and iSeries models that can support up to 64 processors, double the previous threshold for CPUs.

The systems are priced from $451,000 for an eight-way system to $4 million for a system with 64 processors, IBM said.

The eServer p5-590 and p5-595 systems can run either Linux or IBM's AIX version of Unix. IBM said that when a server is equipped with AIX 5.3, its processors can be split into as many as 10 partitions that can each run a copy of the operating system and handle different applications.

Dan Olds, an analyst at Gabriel Consulting Group Inc. in Beaverton, Ore., said the key advantage of the p5 systems for large IT shops is their virtualization management capabilities. "Now you're talking about a large Unix server that is a heck of a lot more useful than they used to be," he said.

IBM's eServer i5-595 system, the newest member of the iSeries line that was formerly known as the AS/400, runs the i5 operating system that's compatible with OS/400 releases dating back to 1999. The i5 also runs AIX, Windows and Linux.

Better App Management

An early i5 adopter, Beverly Russell, IT director at E.D. Smith & Sons Ltd., a food products manufacturer in Winona, Ontario, is using a two-processor system to run compute-intensive business intelligence applications. Russell noted that the system's virtualization capabilities can manage application resources at the microprocessor level.

In one instance, the i5 shifted computing resources from one partition to another but carefully managed the reallocation, "never taking it down to the minimum where the performance will be impacted," Russell said. The Power5 processors also boost application performance, she said.

Clay Ryder, an analyst at The Sageza Group Inc. in Union City, Calif., said boosting the iSeries capacity to 64 processors creates "an awful lot of horsepower" for a system that has long been aimed at midsize companies. "It's kind of hard to not think about it as a kind of a miniframe," said Ryder, who sees the i5 systems being adopted for server consolidations.

Power5 Systems

- **IBM completed its Power5 lineup in its pSeries and iSeries systems.** There are a number of configurations.
- **IBM will continue to sell its Power4 chip through 2005.** The company says customers are still rolling out these systems.
- **The pSeries and iSeries can be sold with on-demand capabilities.** Customers can have the processors on hand and turn them on – and pay for them – when needed.
- **The systems will ship Nov. 19.**

Jean Bozman, an analyst at IDC, said IBM is bringing out the systems at a time when IT managers are once again starting to buy high-end systems. Interest in low-cost servers isn't waning at all, Bozman said. But she added that many companies are interested in improving server utilization by consolidating applications onto larger machines.

IBM officials said the new systems are three times faster than their predecessors in the Regatta line, and they cost 40% less than the Regatta products. It also maintained that the new systems offer better pricing and performance than rival products do, but analysts said that's a race that never ends. **50109**

Business Objects Takes Next Step on BI Integration

BY HEATHER HAVENSTEIN

Business Objects SA last week began shipping a beta version of a business intelligence software upgrade that expands the ties between its data analysis tools and the reporting technology that the company acquired when it bought Crystal Decisions Inc.

The new release, called BusinessObjects 11, will knit together query and analysis, reporting, business scorecarding and executive dashboard tools, plus underlying data integration technology, on a single software platform. Lance Walter, vice president of product marketing at Business Objects in San Jose, said general availability is expected by the end of the year.

In June, Business Objects began shipping an upgrade that provided front-end integration between its software and the reporting tools developed by Crystal Decisions, which it acquired late last year. The front-end links include a unified software portal and common Web services application programming interfaces, said Walter, who added that they let users move seamlessly between Crystal-generated reports and analytical applications built around Business Objects' tools.

The back-end connections included in BusinessObjects 11 will provide a unified infrastructure for integrating data and managing metadata, said IDC analyst Dan Vesset. The ability to manage the various business intelligence tools as a single platform could help users lower IT costs, he said. "At the end of the day, you have one BI suite that addresses the needs of a broad range of users," he noted.

MORE ONLINE
For more resources, visit our BI Knowledge Center:
QuickLink a4630
www.computerworld.com

Emergency Medical Associates, a Livingston, N.J.-based emergency-room staffing company, uses Business Objects' Application Foundation framework to deliver electronic patient records that are stored in a data warehouse to end-user dashboards. EMA, which added Crystal's reporting tools to its business intelligence infrastructure before the acquisition, has signed on to beta-test BusinessObjects 11.

Jonathan Rothman, EMA's director of data management, said he currently has to use data extraction, transformation and loading tools to move operational data into the data warehouse and connect it to the company's Business Objects applications. With BusinessObjects 11, he said, "I'll be able to take the Crystal reports themselves and just put them into Application Foundation and have those point to the operational data source."

The beta release keeps Business Objects on target to meet the road map it laid out in January for integrating the two product lines, said Mike Schiff, an analyst at Current Analysis Inc. in Sterling, Va.

Next year, Business Objects plans to complete the integration process by releasing BusinessObjects 12, a new suite that company officials said will expand the functionality of all its current products. **50112**

Consider the dots connected. By combining networking, Internet and long distance services into a single turnkey solution, we're helping one of the largest healthcare providers in Texas stay connected. Move large amounts of critical data quickly and reliably. Adapt to long-term growth efficiently. And save money along the way – more than $1 million over the next three years. Find out more about how we're helping Daybreak Venture connect the dots at sbc.com/dots. **GOING BEYOND THE CALL.®**

SBC

SBC, the SBC logo and GOING BEYOND THE CALL are registered trademarks of SBC Knowledge Ventures, L.P. and/or its affiliates. © 2004 SBC Knowledge Ventures, L.P. All rights reserved.

L.A. Finds PeopleSoft Better The Second Time Around

City applies lessons learned from a disastrous past supply chain project

BY MARC L. SONGINI
LOS ANGELES

THE SECOND major rollout of PeopleSoft Inc. software by the city government here is proving far less troublesome than the first PeopleSoft rollout four years ago, when an implementation was bogged down with internal resistance and inadequate training, among other problems.

This time, said city officials, end users have been convinced that the supply chain software coming in will make life better for them. Installation of PeopleSoft's Enterprise 8.8 e-procurement and strategic supplier software is slated to be completed in February. The new version promises significant changes for users, since the city government will be able to handle supplier transactions directly over the Internet.

"Change is a lot easier when people trust that you are not doing anything that will hurt them," said Robert Jensen, assistant general manager in the Los Angeles municipal government's Department of General Services. Jensen and members of his staff spoke with *Computerworld* last week to detail the implementation and describe how officials avoided the problems caused by the 2001 installation.

Jensen said his department, the project sponsor, learned the hard way that it makes a difference when users "know that you are looking out for them and trying to make their work easier and more manageable."

Even the tone is different this time around: Meetings held with department heads are now "well received," he said. It was quite different a few years ago, when a number of users were hostile to an $11 million PeopleSoft supply chain management software implementation [QuickLink 20455] that changed the authority and responsibilities of many city workers. "We all shared the pain," Jensen said.

MARC L. SONGINI

L.A. LEARNED to get user buy-in for its second PeopleSoft project.

Using the direct-connect methodology in Version 8.8, buyers will, for example, be able to go directly to the Office Depot Web site, grab inventory data and use it to populate the city's own purchase-order documents online.

About 35% of the city's procurement will be automated in that way, reducing the amount of manual data entry needed and streamlining the process, Jensen said.

The new software will also help reduce the number of big-ticket items the city has on hand, such as computers and related equipment. Rather than warehouse those items, the city can ensure that its vendors will have stock nearby and thus be able to deliver it the next day.

In addition, strategic sourcing software will allow the general services department to pull in vendor solicitations from all over the Web and get the best discounts.

Yet those changes haven't caused a repeat of the morale woes of 2001.

In an effort to ensure project success, the general services department will spend money upfront for change management to make sure changes are communicated to city personnel and adequate training on the new system is provided prior to the rollout.

Hard Lesson

Officials said that communication strategy results from a hard lesson learned from the initial rollout — good change management requires a plan that identifies anyone on the city workforce whose role can change because of the new software.

"The plan needs to identify champions, owners, stakeholders and users and what and when you will communicate with them and the media used for that communication," Jensen explained. "The other part is how to self-motivate these folks to want to spread the word that the change is good and should be supported."

There wasn't adequate planning in 2000, Jensen said, and a lack of communication with city personnel caused significant resistance from users, particularly in those departments where the PeopleSoft applications caused employees to lose application support, personnel and buying authority.

"We weren't popular," Jensen said. "Change is hard, so the police and fire and sanitation departments were leading the charge to go back to the thrilling days of yesteryear."

It took almost four years, Jensen said, but the planning effort for the latest implementation has encountered little resistance so far. **50106**

FIXING A SOFTWARE MESS

Jensen explains how L.A. was able to convert user resistance into support:

QuickLink 50107
www.computerworld.com

PeopleSoft Product Exec Follows CEO Out the Door

BY MARC L. SONGINI

Just two weeks after PeopleSoft Inc. ousted former CEO Craig Conway, the business applications vendor said that another top executive — Ram Gupta, who had been executive vice president of products and technology — has left the company.

PeopleSoft spokesman Steve Swasey last week confirmed Gupta's exit from the company but declined to disclose any details, leaving it unclear whether Gupta was fired or left voluntarily. "We don't discuss the departure of employees and personal employee business," Swasey said.

It's unclear whether RAM GUPTA's exit from PeopleSoft was voluntary.

Gupta was the executive in charge of integrating PeopleSoft's applications and the software developed by J.D. Edwards & Co., which PeopleSoft acquired last year. In an interview with *Computerworld* in August, Gupta said the merger had provided J.D. Edwards users with more product choices and better technical support offerings [QuickLink 48964].

But many J.D. Edwards users have said that life under PeopleSoft's ownership has been a mixed bag and that they remain unconvinced about the benefits of the acquisition. And during his keynote speech at PeopleSoft's Connect 2004 user conference the week before he was fired, Conway acknowledged that the company had made well-intentioned errors while trying to implement some of its software licensing and upgrade policies with the J.D. Edwards user base.

PeopleSoft's board removed Conway from his position as president and CEO on Oct. 1, saying that it had lost confidence in his ability to lead the company. Co-founder Dave Duffield, who had given up the CEO job to Conway in 1999, was brought back to run the software vendor.

Stan Swete, who worked as an executive at PeopleSoft between 1992 and 2002 and was one of the principal architects of its flagship PeopleSoft 8 product line, was hired to replace Gupta, according to Swasey. He said Swete's return to the company demonstrates Duffield's commitment "to re-energize PeopleSoft's innovation and technology development."

John Moore, an analyst at ARC Advisory Group Inc. in Dedham, Mass., said Gupta's departure was more a matter of when than if following Duffield's return and the appointment of PeopleSoft board member Aneel Bhusri as vice chairman with responsibility for the company's product and technology strategy.

An open question is whether an 18-month-old initiative for simplifying installation and management of PeopleSoft's applications will now fade away, Moore said. Conway and Gupta had championed the Total Ownership Experience initiative. The simplification strategy was well received by users, Moore said, but he added that as a way of gaining new business for PeopleSoft, "it fell flat." **50100**

Microsoft

YOU MAY NOT HAVE TIME TO STUDY THE TCO OF WINDOWS AND LINUX, BUT THE YANKEE GROUP DOES.

"For midsized and large organizations, a significant Linux deployment will neither be free nor easily accomplished. In fact, respondents at large organizations reported that a wholesale switch to Linux from Windows® or Unix would significantly increase TCO for the forseeable future."

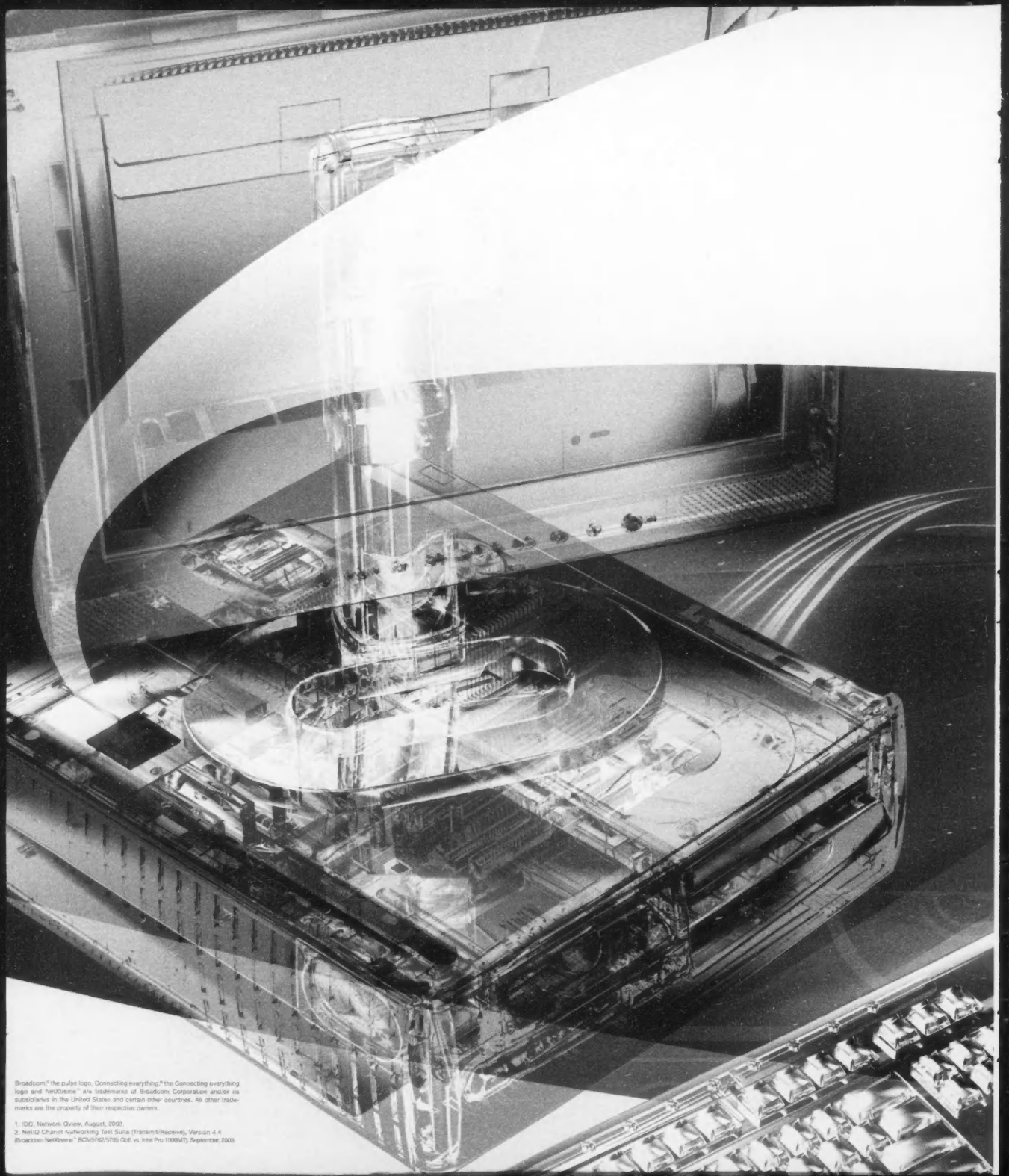
–Laura DiDio, The Yankee Group, April 2004
Linux, Unix, and Windows TCO Comparison

The Yankee Group, a global research and consulting firm, concluded that a significant switch to Linux from Windows or Unix could cost three to four times as much without delivering tangibly better performance or business value. These findings are based on a non-sponsored worldwide survey of 1,000 IT administrators and C-level executives in midsized and large enterprises.

To get the full study, visit **microsoft.com/getthefacts**

© 2004 Microsoft Corporation. All rights reserved. Microsoft, Windows, the Windows logo, and Windows Server System are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Microsoft® Windows Server System™



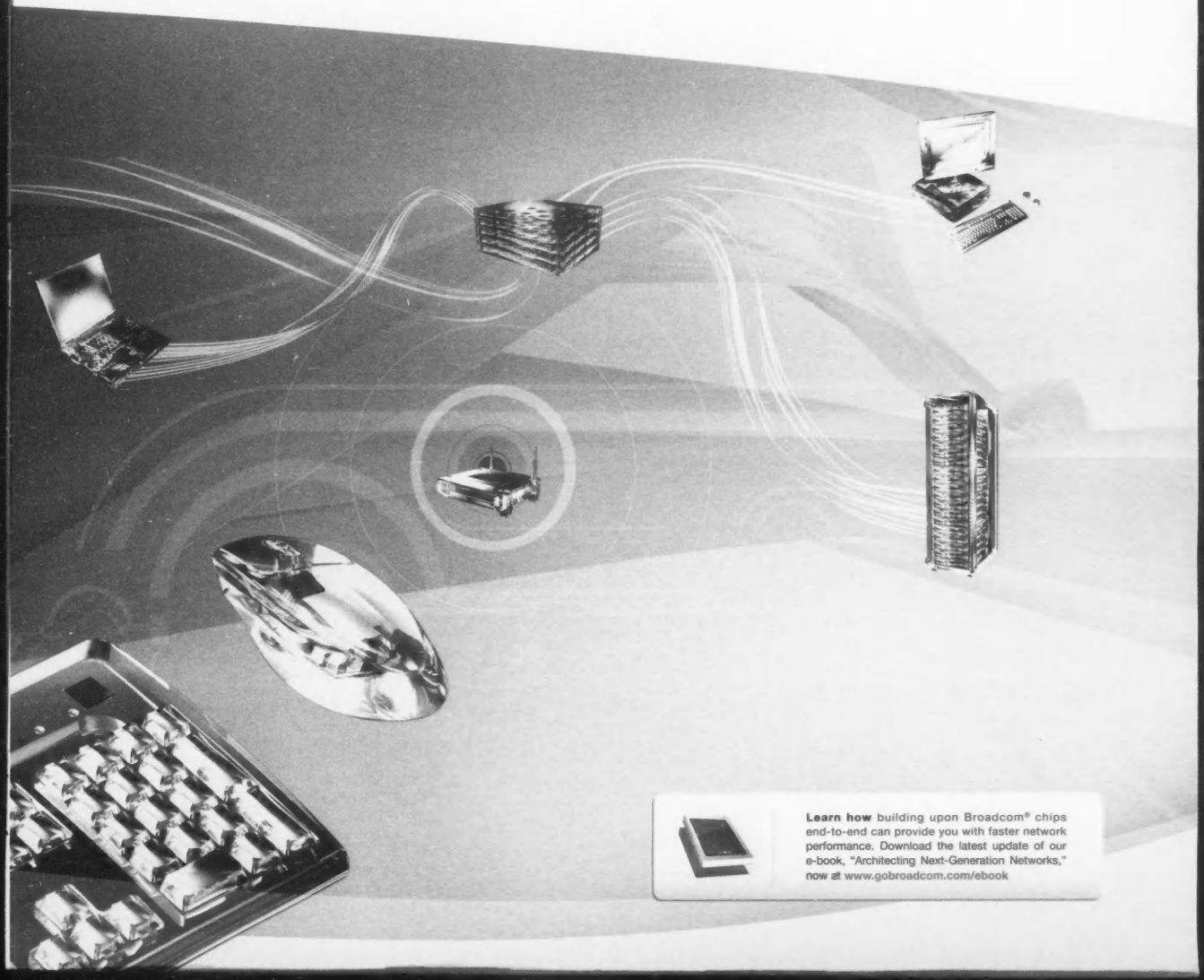
Broadcom,® the pulse logo, Connecting everything,® the Connecting everything logo and NetXtreme™ are trademarks of Broadcom Corporation and/or its subsidiaries in the United States and certain other countries. All other trademarks are the property of their respective owners.

1. IDC, Network Qview, August, 2003.
2. NetIQ Chariot Networking Test Suite (Transmit/Receive), Version 4.4 Broadcom NetXtreme™ BCM5782/5705 GbE vs. Intel Pro 1000MT), September 2003.

HOW CLOSE ARE YOU TO THE NEXT GENERATION OF NETWORKING?

THE ANSWER IS JUST BENEATH THE SURFACE

Within your desktops, notebooks, switches and servers are chips enabling your business to operate in real time, delivering Gigabit speed both reliably and securely. When the top 10 computer and networking equipment brands need unsurpassed performance, they turn to us.[1] Broadcom® chips are two to three times faster than the closest competitor's in delivering network throughput on your demanding applications.[2] Whether you're wired or wireless, networking hardware built with Broadcom technology ensures the devices you use today—as well as those you add tomorrow—will connect easily and seamlessly across air, fiber and copper.



Learn how building upon Broadcom® chips end-to-end can provide you with faster network performance. Download the latest update of our e-book, "Architecting Next-Generation Networks," now at www.gobroadcom.com/ebook

Kumar Launches IT Investment Firm

BY SCARLETT PRUITT
CANNES, FRANCE

Sanjay Kumar, the former chairman and CEO of Computer Associates International Inc., made a surprise appearance at the ETRE 2004 conference here last Monday, three weeks after he was indicted in U.S. District Court for securities fraud and obstruction of justice.

KUMAR plans to "give back to the industry and create jobs."

Kumar, who is charged with taking part in a fraudulent accounting scheme at CA during 1999 and 2000, wasn't listed as a speaker on the conference's preliminary agenda. He didn't comment directly about his indictment, but he described his departure from CA in June after 17 years with the software vendor as the start of a new chapter in his life.

"There are still tremendously exciting things to do," Kumar told the audience of IT industry executives and venture capitalists. "I'm focused on building new technology companies today." He said he hopes to mentor start-ups, adding that emerging technologies such as voice-over-IP telephony are creating marketing opportunities for vendors.

In a follow-up interview, Kumar said he attended the ETRE conference to network and to hunt for companies to invest in. He said that after leaving CA, he took a vacation, thought about what he wanted to do and decided to launch a technology investment firm. "I think it's a really good way to give back to the industry and create jobs," Kumar said.

Advice 'On Demand'

OnDemand Partners LLC, which he started two months ago with a group of other IT veterans, offers advice, money and development support to start-ups. Kumar said that because of his background in enterprise software and his endorsement of subscription-based pricing approaches, he is focusing on those two areas.

The Locust Valley, N.Y.-based firm's name is a play on words that refers to both on-demand computing and the way in which the company's partners will step in to help companies "on demand," Kumar said. OnDemand Partners currently is working with 14 vendors and is on the lookout for more, he added.

Kumar was indicted last month by a federal grand jury in Brooklyn, N.Y., for allegedly participating in an accounting scheme at CA. Prosecutors charged that CA adopted a so-called 35-day month accounting policy, under which some sales contracts that were signed after a fiscal quarter had ended were backdated so that they appeared to have been completed during the quarter [QuickLink 49647].

Stephen Richards, CA's former head of worldwide sales, was also indicted. Both Kumar and Richards pleaded not guilty. Their indictments were announced on the same day that CA agreed to pay $225 million to reimburse shareholders for the alleged fraud as part of a settlement deal with the U.S. Department of Justice. **50086**

Pruitt is a reporter for the IDG News Service.

Continued from page 1

Sarb-Ox

Todd Naughton, vice president and controller at Zebra Technologies Corp., said the Vernon Hills, Ill.-based supplier of printer components "really just started looking" at general IT controls within the past three months.

For the past year, Zebra has focused on documenting, remediating and testing application-level controls throughout the organization, including mapping defined job roles to the system access levels they require, said Richard Jaszka, the company's internal audit manager.

"That said, we're concerned about our ability to meet the Section 404 requirements of Sarbanes-Oxley for the other IT controls," said Jaszka. For example, although Zebra has documented policies for key areas such as change management, systems development and mission-critical computer operations, "it will be a challenge to properly test these controls and address any necessary remedies by year-end," Jaszka said.

He added that regulators haven't specified which IT controls need to be documented and tested.

Compliance Gap

Stan Lepeak, an analyst at Meta Group Inc., said he wouldn't be surprised if 25% of accelerated filers are found to have inadequate controls. He based his estimate on several factors, including discussions with clients, Sarbanes-Oxley readiness surveys conducted with client firms, and concerns expressed by customers who outsource IT that service providers won't be able to document the IT controls in time.

"It really depends on how strict external auditors will be in determining what are material weaknesses or deficiencies in controls and what aren't," said Lepeak.

Herman Miller Inc., a Zeeland, Mich.-based maker of office furniture, decided this past spring to adopt a set of guidelines for evaluating IT controls called Control Objectives for Information and Related Technologies, or Cobit, created by the IT Governance Institute and the Information Systems Audit and Control Association, both of which are based in Rolling Meadows, Ill., said Rich Russell, director of application development.

"We worked with our auditors to determine which of the Cobit processes were in scope for [Section] 404 and then we focused on those," said Russell, whose company has until May 31, 2005, to attest to its IT and financial controls.

Wyndham International Inc. has been working with several consulting firms since last year to document its IT controls, said Mark Hedley, senior vice president and chief technology officer at the Dallas-based hotel chain.

As a result, Wyndham "has very high confidence in our IT key internal controls that will receive the scrutiny of our Sarbanes audit team," he said. **50093**

AT A GLANCE

Sarbanes-Oxley

WHAT IT IS: The Sarbanes-Oxley Act requires most large companies to attest to the financial and IT controls they have in place for fiscal years that will end on or after Nov. 15, 2004, in their annual reports.

WHY IT MATTERS: Few IT staffers know much about the controls that support general IT activities. That is typically overseen by internal audit and/or IT audit departments.

MORE ABOUT SARB-OX

Documentation software helps companies that have more time to comply.

QuickLink 50068
www.computerworld.com

Later Timetable Gives Some Filers More Wiggle Room

SOME COMPANIES that can wait until 2005 or later to meet the initial Section 404 requirements of the Sarbanes-Oxley Act have already spent months working on IT control assessments and are well positioned to complete their documentation and testing efforts ahead of schedule.

For instance, Science Applications International Corp. in San Diego began evaluating its IT controls in July 2003 and started documenting them last December – even though the research and engineering company doesn't have to attest to those controls until Jan. 31, 2006, said John R. Hartley, SAIC's director of accounting operations.

While SAIC isn't an accelerated filer, "that doesn't alter the priority, attention or resources that we place on our Sarbanes-Oxley activities," said CIO Cora Carmody. "It has been, and will continue to be, my top priority in IT and the corporation's top priority."

Herman Miller Inc., a maker of office furniture, began evaluating its IT controls in March and expects to finish internal testing by year's end. External auditors will conduct tests in February 2005 to meet the May 31 deadline, said Rich Russell, director of application development.

"At the outset of our compliance efforts, we did not understand the requirements for IT controls – we were more focused on application controls," he said. Russell and his colleagues discovered that IT is a foundational piece of Herman Miller's controls architecture after a more thorough study of the company's IT control issues.

Even though Portland General Electric Co. doesn't have to meet its Section 404 requirements until December 2005, the utility recently completed its IT control design assessment and is planning to begin testing those controls by the end of this month, said Ross Wescott, chief IT auditor at the Portland, Ore.-based electric utility.

Said Wescott, "It is our goal to practice for a year, so when it comes to reality, we're ready."

– *Thomas Hoffman*

Free Case Study

Receive a FREE third-party case study on the benefits of InfraStruXure.™

Key Code u601y

http://promo.apc.com

(888) 289-APCC x3257 • FAX: (401) 788-2797

APC
Legendary Reliability®

Free Case Study

Receive a FREE third-party case study on the benefits of InfraStruXure.™

☐ **YES!** Please send me my FREE case study!

☐ **NO.** I'm not interested at this time, but please add me to your mailing list.

Name: Title:

Company:

Address: Address 2

City/Town: State: Zip: Country:

Phone: Fax: E-mail:

☐ ***Yes!*** ***Send me more information via e-mail and sign me up for APC PowerStream e-mail newsletter.***

Key Code u601y

What type of availability solution do you need?
☐ UPS: 0-16kVA (Single-phase) ☐ UPS: 10-80kVA (3-phase AC) ☐ UPS: 80+ kVA (3-phase AC) ☐ DC Power
☐ Network Enclosures and Racks ☐ Precision Air Conditioning ☐ Monitoring and Management
☐ Cables/Wires ☐ Mobile Protection ☐ Surge Protection ☐ UPS Upgrade ☐ Don't know

Purchase timeframe? ☐ < 1 Month ☐ 1-3 Months ☐ 3-12 Months ☐ 1 Yr. Plus ☐ Don't know

You are (check 1): ☐ Home/Home Office ☐ Business (<1000 employees) ☐ Large Corp. (>1000 employees)
☐ Gov't, Education, Public Org. ☐ APC Sellers & Partners

©2004 APC. All trademarks are the property of their owners. ISX4AMEB-USa_2c • E-mail: esupport@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 36 WEST KINGSTON RI

POSTAGE WILL BE PAID BY ADDRESSEE

APC

ATTENTION CRC: u601y
Department: C
132 FAIRGROUNDS ROAD
PO BOX 278
WEST KINGSTON RI 02892-9920

How to Contact APC

Call: 1-888-289-APCC
use the extension on the reverse side

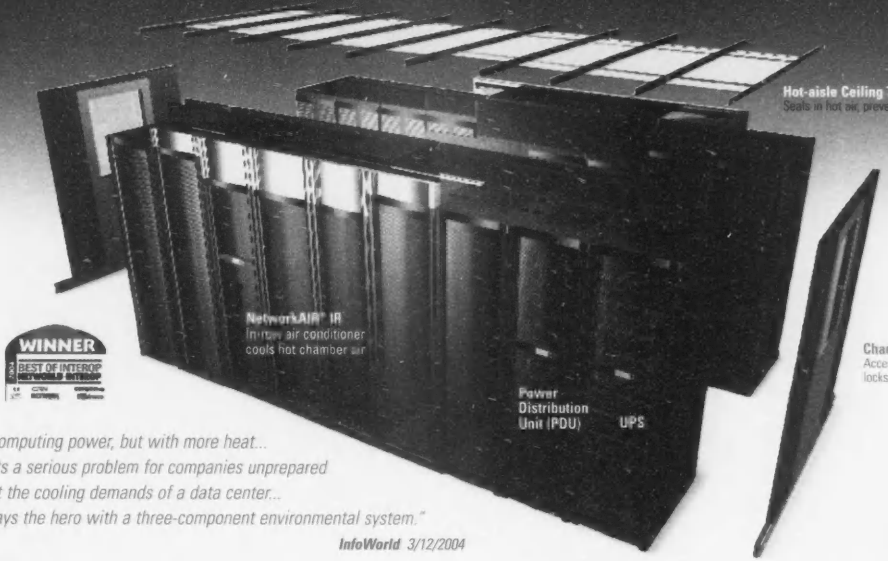
Fax: (401) 788-2797

Visit: *http://promo.apc.com*
use the key code on the reverse side

APC
Legendary Reliability®

Introducing data centers on demand

New architecture supports power densities of today... and tomorrow



"More computing power, but with more heat... presents a serious problem for companies unprepared to meet the cooling demands of a data center... APC plays the hero with a three-component environmental system."

***InfoWorld** 3/12/2004*

Part Number	Usable IT Racks	kW per Rack	Price
ISXT2MD6R	6	up to 5kW	$149,999*
ISXT2MD11R	11	up to 5kW	$249,999*
ISXT2MD40R	40	up to 5kW	$699,999*
ISXT2MD100R	100	up to 5kW	$1,649,999*
High Density Configuration *(shown above)*			
ISXT2HD8R	8	up to 10kW	$399,999*

High density upgrades start at $10,999
On-site power generation options start at $29,999

All configurations feature:

- ✓ *N+I power and cooling*
- ✓ *Secure, self-contained environment*
- ✓ *Integrated management software*
- ✓ *Enhanced service package*

InfraStruXure™

POWER RACK COOLING

On-demand architecture for network-critical physical infrastructure

What is data center on demand?

Highly available and manageable, quick-to-install, scalable architecture that easily supports both standard- and high-density applications.

- *Up to 20kW a rack*
- *Unlimited racks*
- *Ships in 5 days***
- *Installs in 1 day***
- *Optional on-site power generation*
- *Raised floor optional*

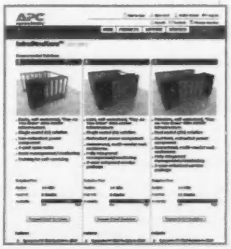
Order your solution today. Call 888-289-APCC x3257.

Don't see the configuration you need?

Try APC's online InfraStruXure™ BuildOut Tool today and you'll receive a FREE third-party case study on the benefits of InfraStruXure.

Go to *www.promo.apc.com* and enter key code u601y

InfraStruXure™ BuildOut Tool



Need a different configuration?
Try our free online InfraStruXure™ BuildOut Tool to find out more.

APC
Legendary Reliability®

* Prices do not include IT equipment ** Install and delivery times may vary

©2004 American Power Conversion Corporation. All Trademarks are the property of their owners. E-mail: esupport@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA ISX4A4EF-USa

Dillard's department stores found a real bargain.
Xerox assessed and streamlined their company-wide work processes and printing needs, saving them $1.6 million.
There's a new way to look at it.

XEROX.

xerox.com/learn 1-800-ASK-XEROX ext. LEARN | Technology | Document Management | Consulting Services

© 2004 XEROX CORPORATION. All rights reserved. XEROX® and There's a new way to look at it are trademarks of XEROX CORPORATION.
Dillard's is a registered trademark of Dillard's Inc.

Oracle Exec Defends Pricing Policy on Multicore Systems

BY THOMAS HOFFMAN

The development of servers based on multicore processors, in which two or more CPUs are placed on a chip, has raised concerns among some IT managers that the new technology will result in significant software cost increases [QuickLink 49648]. **Jacqueline Woods,** *vice president of global licensing and pricing strategy at Oracle Corp., discussed the company's multicore pricing plans with* Computerworld *this month.*

What is Oracle's position on software licensing for dual-core processors? We don't have a position with respect to dual-core processors. A core is equal to a CPU, and all cores are required to be licensed. Therefore, you are required to have two processor licenses.

Does this represent a change in Oracle's licensing policy? We have not changed. We have not increased our prices. At the end of the day, the consumption of the Oracle software is unchanged.

Has multicore server software pricing become a contentious issue between Oracle and your customers? Not at all. IBM does not sell any single-core CPU machines. All of their machines are dual-core and have been for some time. It's particularly interesting that a hardware vendor that I won't necessarily mention who came out with a [dual-core] UltraSparc III chip on a single wafer should try to change the way the software is licensed. When it was called into question, we clearly made sure that everyone understands that a core equals a processor.

So if a user moves from a single-processor server to a two-way server, do they essentially have to pay double for software on the newer machine? If I have more processors, do I pay more money? Yes. You have to pay for the one incremental processor that you have not licensed. If you had a four-way node and you want to go to an eight-way, you need more incremental processors. Do you pay for eight processors? Yes.

Some analysts and IT managers believe that large software vendors like Oracle and IBM are taking advantage of multicore systems to drive higher revenues following a period of weak tech spending. How would you respond? That's not an accurate statement. We have had this policy for years. We had it during the downturn, and we have it now. It hasn't changed. If someone licensed software on a dual-core machine during the downturn, they paid for two processors. I don't see the recovery of the economy as an opportunity to leverage the advent of multicore, considering this had been the same policy when the economy was worse off than it is now. **50053**

Coding Error Shuts Down PayPal

BY TODD R. WEISS

PayPal Inc.'s online payment Web site slowly returned to normal operations last week after an unspecified coding error virtually shut down the site for four days.

The problems began on Oct. 8, when a failed routine monthly code update wreaked havoc for many eBay users who couldn't make or collect payments. The PayPal.com Web site is owned by eBay Inc.

Sara Bettencourt, a spokeswoman for San Jose-based PayPal, said the company doesn't know how many users were affected. After PayPal and eBay engineers worked around the clock for days early last week fixing the problem, Bettencourt said, the system was allowing "most users to transact without incident." She wouldn't disclose the type of coding error.

PayPal.com has about 50 million user accounts, 15.5 million of which are active, Bettencourt said. Account data and personal information weren't compromised, according to PayPal.

A Virginia-based eBay seller, who asked that his name not be used, said he wasn't sure whether the glitches with PayPal.com reduced his sales over the weekend of the failure. But he noted that the upgrade problems are reminiscent of frustrating incidents he has experienced with eBay site changes that were touted as "improvements."

"EBay would change formats on the site and had the same problem" with users having difficulty logging in and making purchases, he said. **50059**

Dillard's department stores hire over 10,000 people a year. Storing and retrieving application, training and benefits packets had become costly. So Dillard's bought into something smart: a Xerox Office Document Assessment (ODA).

Xerox examined their work process across all 14 Dillard's business units and recommended key improvements.

First, all analog copiers, stand-alone printers and fax machines were replaced by Xerox DocumentCentre® multifunction systems. Then Xerox DocuShare® was installed on Dillard's network.

This cross-platform document system, along with Xerox imaging software, digitized key business processes.

Now, instead of storing and distributing hard copy documents with each new hire, store managers go online for hiring packets and print forms on the spot. No paper inventory. No outdated information. $1.6 million saved. To see what you can save, call us or visit our website.

xerox.com/learn
1-800-ASK-XEROX ext. LEARN

XEROX.

DON TENNANT

Expect Nothing

THERE'S A SCHOOL OF THOUGHT that says you should keep people's expectations of you very low. That way, if you ever accomplish anything even marginally above average, they'll be really impressed. Sun Microsystems and Microsoft probably would have done us all a favor if they'd followed that advice last April.

DON TENNANT is editor in chief of *Computerworld*. You can contact him at don_tennant@computerworld.com.

As you may recall, that was when Sun and Microsoft proclaimed that they had settled all their differences and that a new era of cooperation had dawned. The quote attributed by Sun's PR machine to CEO Scott McNealy, while a little stilted, conveyed a collaborative spirit that was full of promise: "This agreement will be of significant benefit to both Sun and Microsoft customers. It will stimulate new products, delivering great new choices for customers who want to combine server products from multiple vendors and achieve seamless computing in a heterogeneous computing environment."

Now that we've passed the six-month mark, I thought it would be worthwhile to find out exactly how those customers have benefited since the Great Pronouncement. So last week I asked John Loiacono, executive vice president of Sun's software group, how the deal had changed things.

"Our conversations with customers have changed pretty dramatically, in that it used to be we had to say bad words every time we mentioned Microsoft," Loiacono responded. "The fact is, we no longer have to do that because we're doing a lot more cooperative work with them versus what we were doing previously."

Let me get this straight: What has changed is that Sun doesn't use bad words when it talks about Microsoft anymore. Well, that's just delightful. But I was hoping to hear something a tad more related to what users have gained, so I pressed him a little. Loiacono's response: "You will see from us within the next 90 days or so that we will not just be talking about generic concepts, but actually talking more specifically about things we're doing with Microsoft and actually showing some examples of progress that we've made."

Ninety days? Interesting. McNealy had said at JavaOne in June that the companies would detail their collaborative work during the summer, and that didn't happen. Then, last month, Mark McClain, vice president of software marketing at Sun, said there would be some sort of interoperability announcement this month [QuickLink 49414]. We can give Sun and Microsoft the benefit of the doubt and presume that will still happen (Microsoft may well be the chief foot-dragger here), although Loiacono's "within the next 90 days or so" comment last week suggested that anything really substantive might be a little further out.

Unfortunately, the only thing we know now that we didn't know in April is that the Sun-Microsoft agreement included a provision (kept quiet by both companies at the time) under which Microsoft can sue users and distributors of OpenOffice, the open-source office suite that Sun acquired from a German outfit in 1999 and released to the open-source community the following year. But users of StarOffice, Sun's commercial distribution of OpenOffice, are protected against legal liability [QuickLink 49495]. That revelation came in an SEC filing on Sept. 13, and it seems fairly self-serving on Sun's part. Anyone who was thinking about using or distributing a release of OpenOffice other than StarOffice might well be having second thoughts. So much for community support.

Then again, Sun got almost $2 billion from Microsoft when it signed that agreement in April, so it had a lot of incentive to be as agreeable as possible, regardless of the impact on anyone else. What would you expect? **50065**

Don Tennant

MICHAEL GARTENBERG

Unbelievable, Scary Babble About USB

IT SEEMS THAT every week, I open the paper or click on a URL and see the same story: Someone is jumping on the bandwagon to tell the horror tale of the potentially scary Universal Serial Bus port. They talk about the security threat represented by the iPod and other portable media players and by ubiquitous USB flash memory devices. The rhetoric has reached new highs, and IT departments are being told to ban all devices of this type and immediately lock down the USB ports on all machines.

MICHAEL GARTENBERG is vice president and research director for the Personal Technology & Access and Custom Research groups at Jupiter Research in New York. Contact him at mgartenberg2@optonline.net. His weblog and RSS feed are at *http://weblogs.jupiterresearch.com/analysts/gartenberg*.

This rhetoric amounts to another kind of USB: "Unbelievable, Scary Babble." Concerns about the security of removable media aren't new, and neither is removable storage itself. Any IT staffers for whom this is suddenly an issue must have entered the industry directly from the proverbial turnip truck.

Some of you might even remember when all PCs came with removable storage devices called floppy disks. And at a time when a hard disk could store no more than 20MB and files tended to be a lot smaller than they are today, a person could carry quite a lot of sensitive data on just a few floppies. Really, this issue dates to when it was first possible to cheaply copy sensitive documents on a Xerox machine.

Security was an issue then, and it's an issue now. Scare rhetoric doesn't help anything; it just gets the folks with the scariest rhetoric some headlines. My favorite line in one recent horror tale was about the fear that infected PDAs syncing to a corporate computer could pass nefarious code on to the corporate network. Of course, we know that unless the PDA is run-

ning the same operating system as the syncing computer, it won't do any harm at all. (Well, unless the PDA was created by Jeff Goldblum — you know, the guy in the movie *Independence Day* who somehow sends a computer virus from his PowerBook to the aliens' mother ship computer, which was fortunately not only compatible but also apparently insecure and buggy. Perhaps they left all the USB ports open.)

What you need to do is balance users' needs with security concerns. The benefits that users derive from carrying relevant portions of their desktops on portable memory devices are simply too great for IT departments to ignore. Your response should involve safe computing policies, education and clear rules on what can be taken off-site. And businesses should set policies on segregating personal data from corporate machines. IT departments must make sure users understand the need to safeguard sensitive information, whether it's in digital format or on paper.

Legitimate security concerns surround removable media, including the potential for corporate data theft and virus attacks. Simplistic responses like blaming the USB port or flash memory devices aren't the answer. "Lock it all down and take it all away" isn't a new philosophy, and it has failed time and again.

Recognizing and accommodating user needs takes more work, but in the end, the results are worth it. **49896**

VIRGINIA ROBBINS

Self-service With a Smile

RECENTLY, it's felt as if my entire life has been spent in airports. The airline I take most often is one of those low-cost peanut tossers that specializes in self-service. After logging over 80 flights in the past year, I remain a fan of this airline. It's been just about a year since I've had to interact with anyone at the entire company other than to give my drink order or to wish someone a good day as I deplaned. It's been great.

Well, except for the time I arrived an hour after my flight had left. The next plane to Oakland was scheduled to leave in 12 minutes; the one after that would land at close to midnight. The customer service agent asked me if I was willing to run through the airport.

Running seemed better than missing dinner, so after he quickly rebooked me, he grabbed my bag, and off we went. We cleared security in record time by using the special employee line. My gate was at the far end of the terminal (of course). Once we passed into his airline's area, the other gate agents started cheering him on: "Go, Bradley! Go, Bradley!" He got me to the plane with three minutes to spare.

VIRGINIA ROBBINS is CIO and managing director at Chela Education Financing in San Francisco. Contact her at v_m_robbins@yahoo.com.

As the door closed behind me, I was nearly out of breath but happy at the thought that I'd be home for dinner.

Exceeding expectations is a challenge in today's automated world of self-service. If Bradley hadn't been overseeing the self-service kiosks, my experience on this trip would have been very different.

My grocery store has replaced its express lanes with self-service checkout stations. The first month the stations were available, only a few brave shoppers used them.

The first time I tried it, the station got stuck in some infinite loop, and I ended up grabbing a clerk to help me. It turned out that because the previous transaction had been for beer, the station needed to know whether I could legally purchase alcohol before it could proceed. I don't know if it's a good thing or a bad thing that I'm clearly over 21, but the clerk entered the code, and I continued scanning my groceries.

A few weeks later, I was back in the store and saw an employee station located in the middle of the self-service area. The same clerk who had helped me was now darting among the stations helping shoppers.

I also noticed that a lot more people were using self-service; a long but quickly moving line had formed in front of the four stations.

As a customer, I like self-service; it's faster and I'm in control. And as a CIO, self-service is one more way I can help my company reduce expenses by using technology.

But the reality is that customers sometimes need someone else to take control. At some point, the cost of programming for each possible customer interaction outweighs the cost of inserting an employee into the transaction. Assuming that the folks in marketing want high levels of customer satisfaction, creating ways for skilled humans to intervene is required.

I'd like to hear your stories. Send me your best or worst experiences with self-service, either as a provider or as a customer, and I'll share the results next month. **49979**

WANT OUR OPINION?

More columnists and links to archives of previous columns are on our Web site: **www.computerworld.com/columns**

READERS' LETTERS

Cell Directory Not Needed – or Wanted

I COULDN'T DISAGREE MORE with the column "Wireless World Needs a Directory" [QuickLink 48752]. I like that my number isn't published anywhere. Like a growing number of people, I've abandoned my land-line phone. I choose whom I give my number to. I appreciate that no one can just look up my number. Should this change, maybe I'll switch to VoIP.

Les Bower
Systems administrator, Orefield, Pa.

"WIRELESS WORLD NEEDS a Directory"? As was said in another context, "This is the worst idea in the long, sad history of bad ideas." There is too much sharing of personal information. I'll publish my cell phone number when every telemarketer and spammer (remember, cell phones get e-mail too) has been eliminated!

Matt Fleming
Network administrator, Cincinnati

NO, THE WIRELESS WORLD doesn't need a directory. Wireless is a special case because you pay for everything – incoming, outgoing, text, voice, etc. Robert Mitchell should use his soapbox to lobby for no-cost incoming wireless calls and messages. There should be no cell phone directory. Not until no one, not even charities, can telemarket. Not until incoming calls and text messages are free across the board. And not until no one can clone your cell number and bill their calls to it because you answered something that looked familiar and you were wrong.

At the risk of being labeled a crank, I will speak out against a cell phone directory until all incoming minutes on all wireless plans are free. Yes, I did read Jay Cline's entire article as well ["Cell Phone Directory Rings True," QuickLink 49184], and I understand that it will be opt-in at first, with only new customers having to opt out. But how long will it be before companies start charging to opt out? And what constitutes a new customer?

I have been going month-to-month with my carrier for a while now. Today, I entered into a contract for a year to take advantage of a deal. The provider could argue that since the contract is new, even though the account is not, it constitutes new service.

B.A. Clouse
Education program manager, Baltimore,
bamyclouse@hotmail.com

Don't Forget Alpha

THANKS for the coverage of the VAX and VMS community, which tends to be ignored these days, and for the positive words about the future of VMS on Itanium. Too many people mistakenly think VMS died long ago.

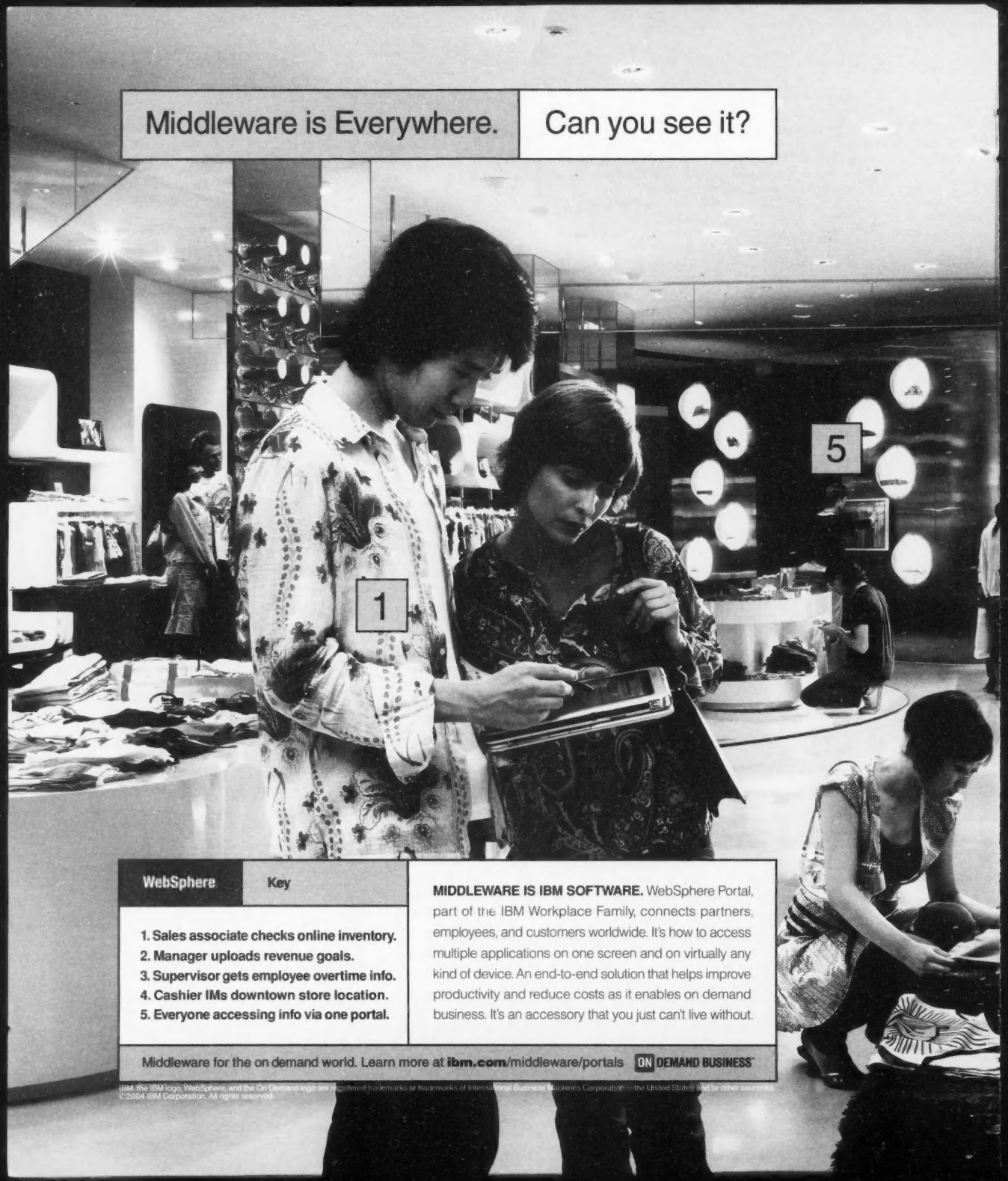
But I'm amazed that the article ["VAX Users See the Writing on the Wall," QuickLink 47934] never mentioned Alpha. The path of least resistance (and least expense) for most VAX users has been to retain their existing software and migrate to newer Alpha hardware, still running the VMS operating system. In most cases, it's been "recompile, relink and go" for their programs, but in cases where source code has been lost, the VEST utility is used to convert a VAX binary image to an Alpha one.

Some VAX users may choose to move straight from VAX to Itanium, skipping Alpha entirely. But HP still develops and sells Alpha systems (and will through at least 2006) and will support them for a minimum of five years after last sale, whenever that occurs. For most VAX users, moving to Windows, Unix or Linux involves very costly code rewrites or wholesale replacement of applications, and they tend to find that those platforms don't provide the stability, reliability, high availability, security (there are no viruses on VMS, for example), low system administrator workload and low TCO that they have become accustomed to with VMS. So for most VAX users today, sticking with VMS and simply moving to newer hardware (including Alpha) is the lowest-cost, lowest-effort and least-risky option to consider.

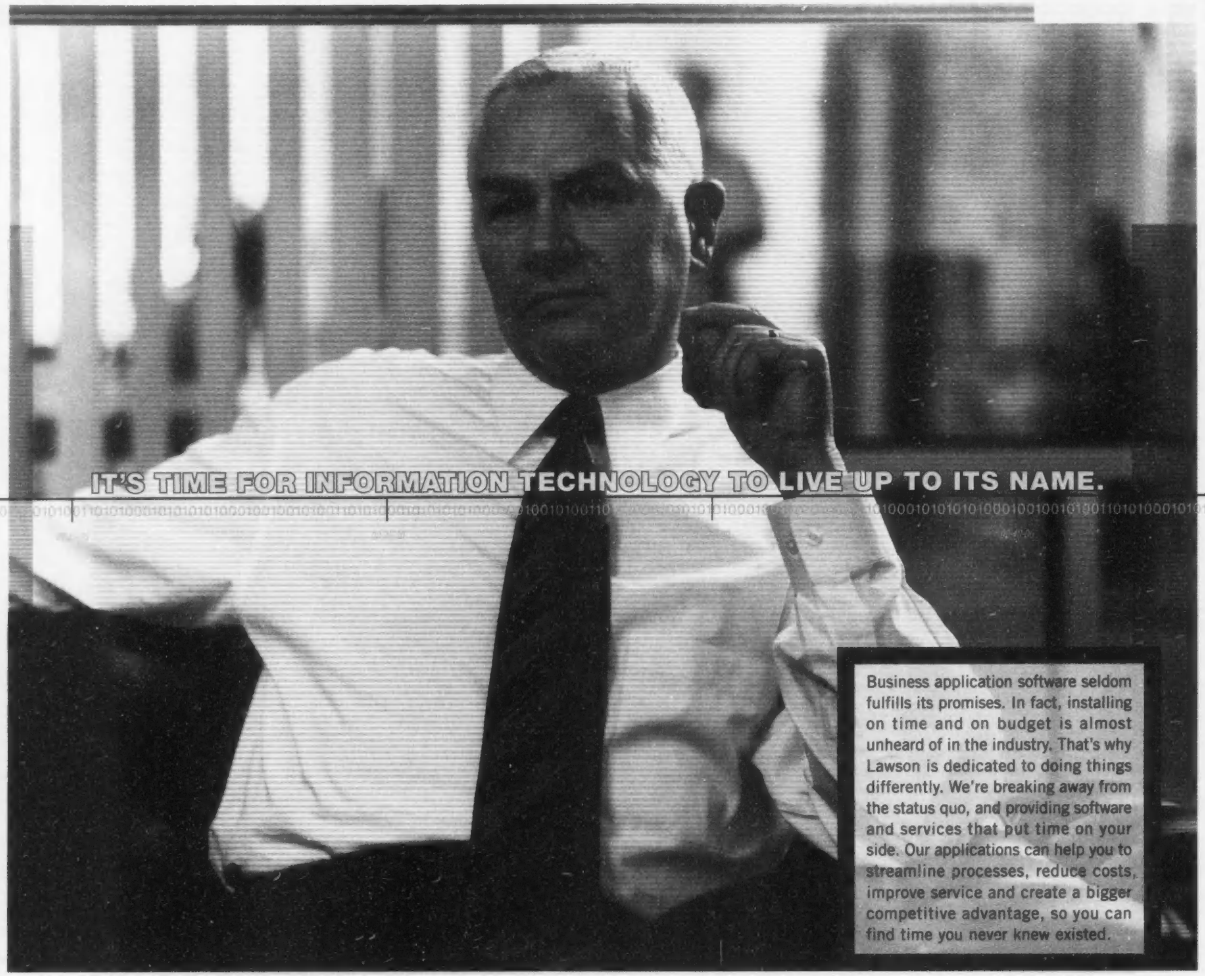
Keith Parris
Colorado Springs

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 1 Speen Street, Framingham, Mass. 01701. Fax: (508) 879-4843. E-mail: letters@computerworld.com. Include an address and phone number for immediate verification.

For more letters on these and other topics, go to **www.computerworld.com/letters**


Middleware is Everywhere.
Can you see it?
1
5
WebSphere
Key
1. Sales associate checks online inventory.
2. Manager uploads revenue goals.
3. Supervisor gets employee overtime info.
4. Cashier IMs downtown store location.
5. Everyone accessing info via one portal.
MIDDLEWARE IS IBM SOFTWARE. WebSphere Portal, part of the IBM Workplace Family, connects partners, employees, and customers worldwide. It's how to access multiple applications on one screen and on virtually any kind of device. An end-to-end solution that helps improve productivity and reduce costs as it enables on demand business. It's an accessory that you just can't live without.
Middleware for the on demand world. Learn more at ibm.com/middleware/portals
ON DEMAND BUSINESS
IBM, the IBM logo, WebSphere, and the On Demand logo are registered trademarks or trademarks of International Business Machines Corporation in the United States and/or other countries.
©2004 IBM Corporation. All rights reserved.

4
2
3
sale
IBM



For more information call 1-800-477-1357 ext. 128 or visit www.lawson.com/success128

LAWSON®

It's Time.™

© 2004 Lawson Software. All rights reserved.

E★VOTE AT RISK

Despite vendor assurances, researchers remain concerned about the security and reliability of electronic voting systems. BY DAN VERTON

THIS NOVEMBER, as many as 50 million Americans could vote for president using some form of electronic touch-screen system, the vast majority of which have been designed by McKinney, Texas-based Diebold Election Systems. That has some IT and security researchers holding their breath because of the faulty track record of Diebold's technology and a government-endorsed testing and certification process that they say is deeply flawed.

Those critics say that direct recording electronic (DRE) voting systems remain vulnerable to manipulation and malfunction, particularly in states that have ignored some recommendations of independent researchers, like Maryland has.

State election officials, on the other hand, say they are confident that appropriate safeguards are in place to ensure the security and accuracy of the 2004 vote.

Among the most pressing issues cited by critics are a lack of technical standards governing DRE software development, the failure of the government to impose transparency on the software testing and certification process, and the lack of technical security knowledge throughout the many state and local jurisdictions that oversee elections where DREs will be used.

Johns Hopkins University professor Aviel Rubin, who last year published a study of portions of the Diebold software code, says the quality of that code was below minimum standards for a production system. Rubin's report cites a lack of industry-standard change-control processes and documentation, as well as specific technical weaknesses.

Jonathan Gossels, founder of SystemExperts Corp. in Sudbury, Mass., says his review of the Diebold code showed that it was "amateurish" in its design. More important, the amount of code that has been studied and found wanting "is only the tip of the iceberg" of the millions of lines of C++ and Microsoft Windows-based code that powers the Diebold touch-screen systems and back-end management servers, says Gossels.

WHERE E-VOTING WENT WRONG

A snapshot of various places around the country where problems with electronic voting systems have been reported.

SOURCE: VOTERSUNITE.ORG

1. CALIFORNIA, 2003: Diebold installs uncertified software without notifying authorities.
2. CALIFORNIA, 2004: State Senate committee passes an urgent bill to ban all computerized voting in 2004.
3. CALIFORNIA, 2004: Secretary of state decertifies Diebold for November election.
4. ALAMEDA COUNTY, 2004: Diebold control modules fail to start up.
5. ORANGE COUNTY, 2004: Hart InterCivic Inc. DREs trip circuit breaker and shut down when batteries die; voters are turned away from the polls.
6. ORANGE COUNTY, 2004: Hart access-code confusion causes 7,000 voters to receive the wrong ballots.
7. SAN DIEGO COUNTY, 2004: Diebold DREs lose votes; control modules fail to start up properly.
8. BERNALILLO COUNTY, 2002: Insufficient memory results in failure to count 12,000 of 48,000 votes.
9. ARAPAHOE COUNTY, 2004: Failure to maintain DRE battery charge results in expenditure of more than $100,000 to replace batteries.
10. DALLAS COUNTY, 2002: Election Systems and Software Inc. (ES&S) iVotronic systems mark incorrect choices on voting screens.
11. HARRIS COUNTY, 2003: Hart DREs don't start; voters must use makeshift paper ballots.
12. HINDS COUNTY, 2003: DREs overheat and break down; election invalidated, then reheld.
13. INDIANA, 2004: ES&S installs uncertified software on iVotronic system and admits the older, certified version won't tabulate votes.
14. FLOYD AND COVETA COUNTIES, 2002: Diebold DREs lock up; access cards malfunction; wrong candidates are marked on-screen.
15. BRYAN AND TERRELL COUNTIES, 2002: Diebold DRE ballots display wrong races and omit some altogether.
16. MUSCOGEE COUNTY, 2003: DREs register "yes" when voters vote "no."
17. GEORGIA, 2004: Diebold ballot encoding mix-ups prevent voting in primary.
18. MONTGOMERY COUNTY, 2004: Diebold DRE shows incomplete ballot when font is magnified.
19. SARASOTA COUNTY, 2004: ES&S DREs fail to count 189 votes.
20. WAKE COUNTY, 2002: ES&S iVotronic software loses 436 ballots.
21. BROWARD COUNTY, 2002: ES&S iVotronic error results in failure to count 22% of the votes.
22. BROWARD COUNTY, 2004: ES&S DREs lose 134 votes; margin is 12 votes.
23. MIAMI-DADE COUNTY, 2002: ES&S iVotronic system fails to count 8.2% of the votes.
24. MIAMI-DADE COUNTY, 2004: Severe audit log bug in ES&S iVotronic system is revealed; it had been detected nearly a year earlier.

The testing procedures of vendors, particularly Diebold, are also under suspicion. Jerry Rudisin, CEO of Agitar Software Inc., a software testing company in Mountain View, Calif., says he suspects that the original Diebold code wasn't subjected to unit testing based on the lack of change-control documentation. And because of this, "a lot of bugs end up getting through to the deployed systems," he says.

A January 2004 study by the Innovative Solutions Cell at Columbia, Md.-based RABA Technologies LLC tested Diebold systems that were to be deployed for Maryland's March 2004 primaries. The study found the general lack of security awareness in the Diebold code "a valid and troubling revelation." In addition, the report confirmed Rubin's assertion that there was little evidence that widely accepted standards of software development had been followed.

MYSTERY TESTS

One of the most critical aspects of the voting system development process is the testing and certification of hardware and software to ensure that they meet voluntary federal voting standards for security and reliability. Three vendors act as so-called independent testing authorities (ITA). However, IT experts are highly critical of the testing process because of its secrecy.

"Election officials are buying a software package, and there's not a lot of transparency," says Rudisin. "With voting software, you pretty much buy a pig in a poke."

Ciber Inc. in Greenwood Village, Colo., and SysTest Labs LLC in Denver act as the two software ITAs. Wyle Laboratories Inc. in El Segundo, Calif., is the hardware ITA. All of them refuse to provide details on how they test the voting equipment or on their findings.

"The ITAs that test these machines are hired by the vendors, so they are not independent and not neutral," says Rubin, who hasn't been allowed by Diebold to re-evaluate the source code since his initial study.

Diebold spokesman David Bear says the company stands behind the testing and source code reviews conducted by "independent, unbiased third parties." The reviews are done at the federal level using standards recommended by the Federal Election Commission and at the state level, he says.

Bear also says voting systems are only a small part of the election process, which has many built-in security precautions and redundancies. "The voting machines are completely standalone," he says. "No network connection of any kind — wired or wireless — is used during the voting process. The only connection to the machine at the polling place is the AC power cord."

With voting software, you pretty much buy a pig in a poke.

JERRY RUDISIN, CEO, AGITAR SOFTWARE INC.

Eric Lazarus, president of New York-based DecisionSmith, says the testing model for e-voting systems "is broken."

Lazarus, lead author of a report by the Brennan Center for Justice and the Leadership Conference on Civil Rights on improving DRE reliability, says 2% of systems should be put through exhaustive testing that simulates Election Day activity. The testing process most states use is based simply on how individual machines count a few test votes.

SUPPORTING ARGUMENTS

Election officials for Maryland, Virginia and California, which have invested millions of dollars in Diebold DRE systems, say they're confident that the voting process can be made secure and reliable even if technical vulnerabilities exist hidden in the software.

"We will not overreact to scare-tactic headlines that do not reflect the long-established security protections required by law, policy and procedure," says Jean Jensen, secretary of the Virginia State Board of Elections (SBE), which hired Arlington, Va.-based CACI International Inc. to conduct an independent security assessment of the Diebold systems. She also points out that few of the e-voting critics "have presented any credentials regarding their expertise in election law or the policies and procedures."

All 46 localities in Virginia where DREs from six vendors will be used are developing security policies and procedures based on the CACI recommendations, and those procedures will be audited during the election, says Barbara Cockrell, spokeswoman for the IT manager at the Virginia SBE.

A DRE must be tested in an actual election before it can be sold in Virginia, says Cockrell, who adds that logic and accuracy tests are a key part of the certification process and that no system touches the public Internet.

Linda Lamone, administrator of the Maryland SBE, criticizes RABA's study of DRE use in Maryland, saying the researchers didn't "conduct the exercise in a polling-place environment under the purview of trained election workers . . . and bipartisan election judges observing voters' activities."

But Michael Wertheimer, the primary author of the RABA report, says he's convinced that the state's election is a disaster waiting to happen. "Despite our recommendations, Maryland has decided that each county will get only one password to protect their precincts. That means only three passwords protect these counties," he says. "If any one of these passwords is compromised and exploited, Maryland is up for grabs. All it takes is one election official to allow someone five minutes' access to the server to completely rig the election."

Not quite, says Lamone. First, she says, no servers are located at polling places. Second, "neither the staff at the local boards of elections nor the election judges know the cryptographic keys to the units or the server administrative passwords," she says. "The alphanumeric keys are created at my office and are only known to people on my staff who need to know." Lamone adds that creating keys unique to each precinct would present "a logistical nightmare" and could endanger the security and efficiency of the election.

Wertheimer remains skeptical about the state's preparations to use DREs. "Maryland refuses to put a firewall on servers that are connected via dial-up modems," he says. "They refuse to upgrade the Windows 2000 operating system with the latest security patches — they were 16 patches behind in January of this year."

Lamone says security experts hired by the state determined that since no component of the voting system is connected to the Internet, the firewall and patches recommended by RABA aren't necessary. Moreover, she adds, "a person would have to have knowledge of the encrypted security controls in place for sending the unofficial results by modem, as well as user identification requirements and passwords, to gain access to the server."

STILL TIME?

Lazarus and Gossels say there is still time for states to implement procedures that can lessen the likelihood of malfunctions and malicious activity and have jointly devised a scorecard that election administrators can use to rate the security and reliability of DRE systems (see box). "The best that we can do in terms of security at this point is still not very good," Lazarus says. "But there's no excuse for not doing some of the easy things."

The bottom line, say Gossels, Lazarus and Wertheimer, is that there will be problems with DREs next month, ranging from malfunctions that cause polling places to close to potentially more nefarious incidents of tampering that nobody is able to detect.

"I am worried that election officials fail to recognize that elections run by computers require a completely different model than those run by paper," says Wertheimer. "It will take a catastrophic voting 9/11 to force change."

QuickLink 49840

ELECTION OFFICIALS' CHECKLIST

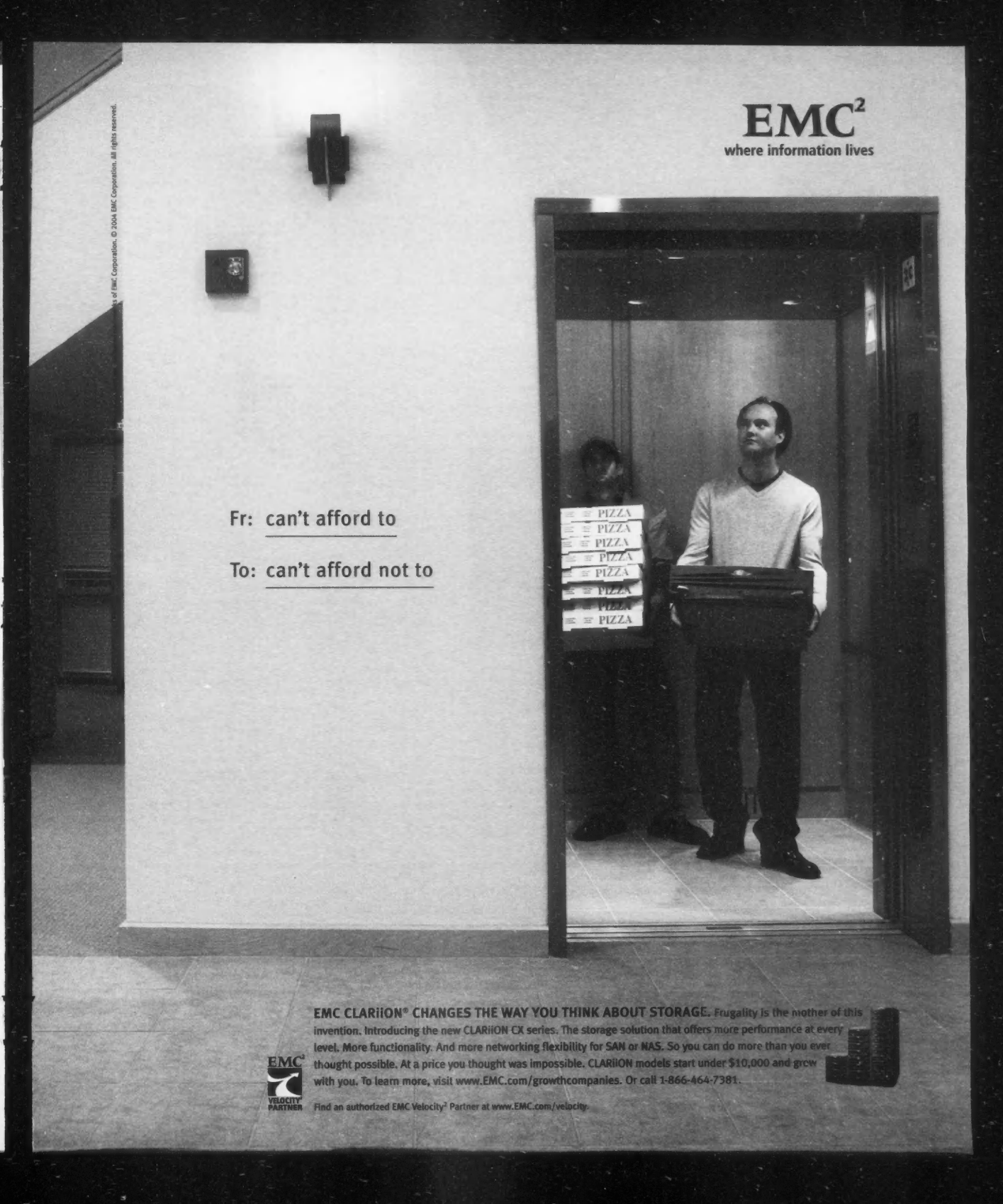
The following measures will help ensure the security of e-voting, say DecisionSmith's Eric Lazarus and SystemExperts' Jonathan Gossels:

- **All machines should be tested using automatic self-test scripts executed on the machines.**
- **Audio and other accessibility interfaces should be tested.**
- **All ballot positions should be tested in all languages.**
- **Intensive hand testing should be conducted simulating Election Day on at least 2% of machines, using test scripts that include casting votes for every candidate on ballots of every style.**
- **Audit logs from voting machines and election management systems should be inspected to reconcile the number of ballots cast with the votes reported.**
- **Records of the chain of custody for voting machines, blank ballots, voted ballots and physical copies of electronic records, including seal numbers and who had custody, must be routinely subject to postelection audit.**
- **Different machines must have their own cryptographic keys and passwords.**
- **Votes and vote totals sent by modem should be cryptographically signed to prevent alteration or forgery.**
- **At least two poll workers from opposing parties must accompany electronic or paper ballots to the counting facility.**

MORE ABOUT E-VOTING

Q&A: Frank Wiebe, president of DRE vendor AccuPoll, talks about developing and testing e-voting systems:
QuickLink 49839

Raising questions: More than one research study has found flaws in e-voting software code and testing:
QuickLink 49849
www.computerworld.com


EMC²
where information lives
Fr: can't afford to
To: can't afford not to
PIZZA
EMC CLARiiON® CHANGES THE WAY YOU THINK ABOUT STORAGE. Frugality is the mother of this invention. Introducing the new CLARiiON CX series. The storage solution that offers more performance at every level. More functionality. And more networking flexibility for SAN or NAS. So you can do more than you ever thought possible. At a price you thought was impossible. CLARiiON models start under $10,000 and grow with you. To learn more, visit www.EMC.com/growthcompanies. Or call 1-866-464-7381.
EMC²
VELOCITY PARTNER
Find an authorized EMC Velocity² Partner at www.EMC.com/velocity.

BRIEFS

IBM Rolls Out Xeon Chips in Servers

IBM last week announced five new blade servers with the Xeon chip that's capable of 32- and 64-bit x86 processing. The systems can support two SCSI drives internally. A chassis will fit 14 SCSI-based blades. The systems, with processor speeds from 2.8 to 3.6 GHz, will be available Nov. 12, starting at $2,039. IBM also detailed an eServer blade server with a 2.2-GHz Power processor that will be available Oct. 29, starting at $2,699.

Alcatel Announces New Switches

Alcatel announced the Alcatel OmniSwitch 6602 Layer 3 workgroup switch, starting at $2,140; the Alcatel OmniSwitch 6600 U24 fiber-to-desktop switch, starting at $3,495; and power-over-Ethernet capability for its OmniSwitch 6600 family, starting at $3,195. They're available now.

SGI Launches Linux Workstations

Silicon Graphics Inc. has announced its new Silicon Graphics Prism line of Linux-based computers for users who require advanced graphics capabilities. The machines use Intel Itanium 2 processors, open standards, ATI graphics accelerator cards and a shared-memory architecture, said SGI. Pricing starts at $30,000.

CA Makes Update To Database App

Computer Associates International Inc. last week said it was shipping Release 11 of its Unicenter Database Management application for IBM's DB2 database running on the z/OS operating system. The new iteration will support Version 8 of IBM's DB2 for z/OS, and its enhancements include improved reliability and faster response times, according to CA. Pricing wasn't disclosed.

ROBERT L. MITCHELL

The Internet Holds No Secrets

ONE OF MY FIRST JOBS out of school in the early '80s was working technical support for a PC clone vendor. It was there that I learned firsthand how the benefits of information technology don't always trickle down to workers — or the customer.

ROBERT L. MITCHELL is *Computerworld*'s senior features editor. Contact him at robert_mitchell@computerworld.com.

My work life was run by a PC that divvied up technical support calls and monitored the average call time and the quantity of calls I completed. Each morning started with a review of our call statistics and the day's call quota. The promise: Those who met the day's per-worker goal could leave the phones and work on software quality assurance testing for the rest of the day. QA was a much more relaxing and desirable assignment. If a worker reached the goal, the monitoring PC would beep loudly, and the person whose name appeared on the display would be done — an event that became known as "beeping off."

In my six months there, I never beeped off before 5:30. Eventually, I came to realize that management already had a full-time QA department but was always short on technical support staff. So it became very good at using the PC-based statistical analysis tools to keep that carrot just out of reach.

The worst part, though, was what the vendor did to its customers. While reviews lauded the quality of its machines, in fact the system BIOS and graphics subsystems had fatal compatibility problems with many applications. Popular business programs that reviewers tested, like Lotus 1-2-3, worked. But many others did not.

Fixing those problems meant returning the PCs under warranty — an expense that management wanted to avoid. So we were ordered not to acknowledge them. When customers called in, we dutifully walked them through all possible solutions, told them their program should work fine, documented their complaint and promised to let them know if a fix became available. This is why my career in technical support was a short one, but to this day, I'm amazed that those problems stayed under the radar despite the fact that we continued to ship defective machines.

What a difference 20 years makes. Today, Internet chat rooms, newsgroups, e-mail lists and Web sites would be buzzing about that company's breach of trust with its employees and customers. Online communities would have quickly identified the company as an undesirable place to work and dubbed its machines lemons.

Information now travels so fast that companies are often left scrambling to contain the damage when bad news hits. Kryptonite, the maker of bicycle locks, was the latest company to face that challenge after word spread on the Internet last month that many of its locks could be picked using a ballpoint pen. The Bic revelation, quickly picked up by the news media, dealt a blow to the company's brand and forced a recall.

Kryptonite may not have known about the flaw, but it was clearly penalized for failing to find and correct the problem before the public did.

The Internet is ruthlessly efficient at disseminating information. To avoid such disasters, businesses need to rigorously, iteratively and methodically test their products for all possible problems and have policies to ethically and directly respond to issues in real time.

But the destructive power of the Internet hits more than business. In the case of Kryptonite, its customers may have suffered collateral damage. The rapid release online of detailed instructions on how to defeat the lock — including a video — let the world know how to steal any bicycle secured with this popular product.

Is it right that such information should be immediately and widely disseminated, no matter how destructive or who might get hurt? Microsoft would say no. It recently criticized a company that publicly claimed to have identified a vulnerability in Word 2000 without first giving Microsoft a chance to verify the problem and develop a patch to protect its customers.

Microsoft's thinking doesn't fly with Daniel Weitzner, a Kryptonite lock user and occasional *Computerworld* columnist whose bicycle was stolen prior to the disclosure. Had he known about the flaw earlier, he might still have his bicycle, Weitzner says.

It's true enough that such disclosures can hurt customers who don't get the news before the bad guys do. But immediate disclosure also empowers users to protect themselves.

Whether doing so is right or wrong is irrelevant in the end, since the Internet doesn't make such distinctions, and we can't put the technology genie back in the bottle. Rather than complain about the situation, both customers and vendors are just going to have to adapt. 49999

WANT OUR OPINION?

For more columns and links to our archives, go to www.computerworld.com/opinions

technical competence: yet another reason to outsource with spi

auspicious endings

Any IT project can get off to a great start. But SPI has the methodologies, standards, tools and technical savvy to deliver successful endings, too. Our global delivery model includes CMMI Level 5 (in progress), Six Sigma and ISO 9001:2000 certifications. And if you like our operational capabilities, you'll really appreciate our grasp of your industry, and how closely we align our business with yours. To learn more, contact us at 866-316-5774 or sales@spiPortal.com. Visit us at www.spiPortal.com.

spi Software Paradigms International

The Offshore Portal for Your Business™

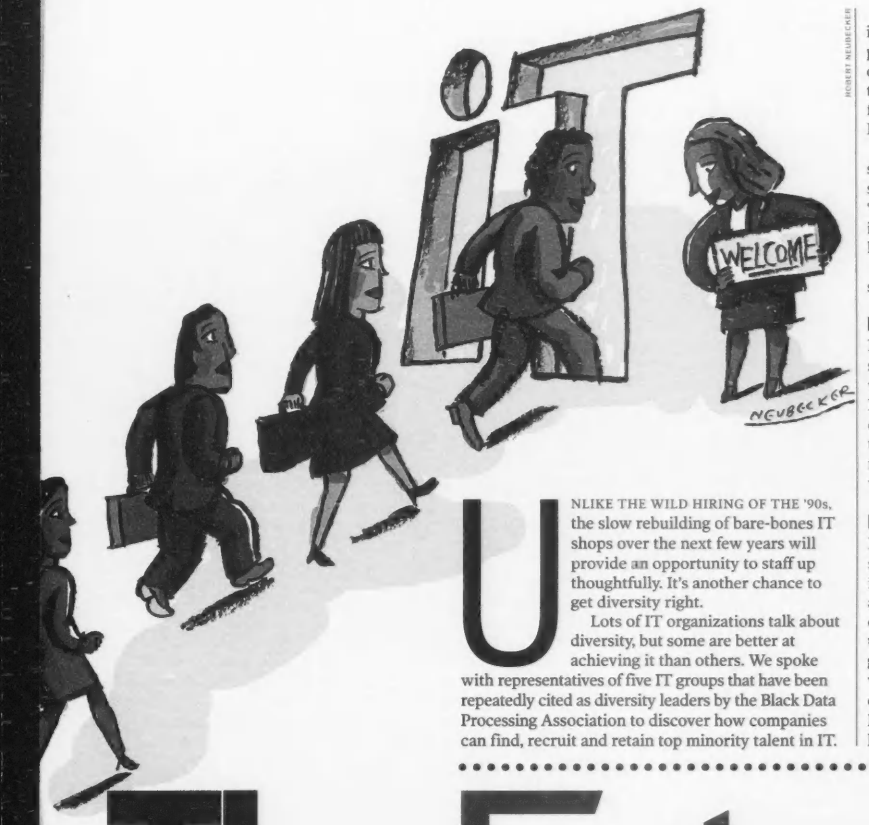
APPLICATIONS DEVELOPMENT/MAINTENANCE/MANAGEMENT | INFRASTRUCTURE MANAGEMENT | BUSINESS PROCESS OUTSOURCING/MANAGEMENT | SYSTEMS INTEGRATION | IT

AMD

AMD 64 Opteron

Five of Wall Street's most prestigious financial institutions knew exactly what they wanted from an enterprise solution. More productivity, to keep up with an ever-changing global market. And real-time flexibility, to go from 32- to 64-bit applications without disrupting their business. They found both in the AMD Opteron™ processor with Direct Connect Architecture. It powers the world's highest performing x86 2-way and 4-way servers. And it helps speed up millions of financial transactions every day in trading stations and server farms. At AMD, we believe it's critical that technology should migrate on your terms to help you realize your unique vision. It's one of the reasons why HP, IBM and Sun offer enterprise-class solutions powered by AMD Opteron processors. Would you like to learn just how much of a difference they can make to your company? **Go to www.amd.com/enterprise**

© 2004 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, AMD Opteron, the AMD Opteron logo and combinations thereof are trademarks of Advanced Micro Devices, Inc. [illegible] and may be trademarks of their respective owners.



ROBERT NEUBECKER

The Extra Mile

If you're ready to really commit to diversity in your IT shop, here's how to achieve it.

By Kathleen Melymuka

UNLIKE THE WILD HIRING OF THE '90s, the slow rebuilding of bare-bones IT shops over the next few years will provide an opportunity to staff up thoughtfully. It's another chance to get diversity right.

Lots of IT organizations talk about diversity, but some are better at achieving it than others. We spoke with representatives of five IT groups that have been repeatedly cited as diversity leaders by the Black Data Processing Association to discover how companies can find, recruit and retain top minority talent in IT.

They all agreed on two things: Achieving diversity isn't quick or easy, and it requires an ongoing, comprehensive commitment. "Diversity is not a one-time event; it is a way of doing business, a part of our culture," says George Hall, senior vice president of information resources human resources at Bethesda, Md.-based Marriott International Inc.

"Diversity is a business strategy," says Andy Baker, senior manager of human resources recruitment and selection at The Allstate Corp. in Northbrook, Ill. "Our company focuses on diversity across the board, in our succession management, recruitment and leadership development."

With that overall approach as the context, here are some of the innovative tactics diversity leaders use:

DEDICATED STAFF

Nothing says commitment like having human resources staff dedicated to achieving diversity in your workforce. At Bank of America Corp. in Charlotte, N.C., Melissa Thompson is vice president of staffing diversity. "I was hired by BOA in October of last year to focus on diversity staffing," she says. "It's a new role. My job is to focus on finding and hiring top diversity talent across the technology space."

PIPELINE RECRUITING

It's hard to be concerned with diversity if you're scrambling to fill holes in your organization. Knowing that, committed companies have learned to look ahead. "We try to anticipate resource needs and recruit skills in a proactive way rather than with such urgency that we can't pay attention to the demographic mix of our population," says Greg Tahvonen, vice president for human resources at Delta Technology Inc. in Atlanta. Looking ahead gives the Delta Air Lines Inc. subsidiary the luxury of grooming a pipeline of talented minority people. "We look to our fu-

ture skill needs, and we look at developmental programs such as student intern programs to be sure we have the right mix of folks in the queue to select from," he explains. Delta also makes sure it's training interns for the jobs it will need to fill when they're ready to enter the workforce.

RELATIONSHIP RECRUITING

Commitment to diversity doesn't stop when hiring slows down. "When the supply side outstrips the demand side, it's extremely important to continue to maintain relationships" with talented minority workers, says Hall. To do that, Marriott relies on "relationship recruiting" he explains. "When we don't have the demands, our associates, including our management team, maintain relationships with those people we would otherwise want to attract."

Relationship recruiting addresses the passive job seekers Hall is trying to connect with. "We're going after the top 5% of the market, and many of those aren't actively seeking opportunities, so the normal channels don't reach them," he says. But relationship recruiting does.

For example, for the past two years, Hall has maintained a relationship with "a very senior individual whom we would love to have" but for whom no suitable opportunity has been available. Hall phones the person, exchanges e-mails, meets for coffee, reports on how things are going — stays in touch. "So if an opportunity does open up, we don't have to re-establish the relationship," he says. "It continues to keep our name out in front of people's minds."

EXPLORATORY INTERVIEWS

Thompson uses what she calls exploratory interviews to recruit top minority talent, even during a hiring slowdown. "We talk to candidates, even though there is no position open," she explains.

The exploratory cycle begins with a quarterly résumé roundtable, where managers go over the résumés of candidates Thompson hopes to recruit, even though no specific positions may be open. They tell her which applicants look most promising, and she calls them in and explains the situation. "I do some coaching so they understand that there is no opening, but if they sell themselves, anything could happen," she says.

It frequently does. "The managers often say, 'Well I was going to hire in Q3, but since you're sitting here, I'll hire you now,' " Thompson says. "We've found it gets managers thinking outside the box. The more exploratory interviews we've done, the more successes we've seen."

TARGETED RECRUITING

Companies committed to diversity get to know minority advocacy groups. Merck and Co. participates in the Society of Hispanic Professional Engineers Inc., the National Society of Black Engineers and the Black Data Processing Association, says Michele T. Ralph, director of information services human resources in Merck's Rahway, N.J., office. "We attend conferences and do a lot of recruiting there," she says. She also maintains relationships with historically black colleges and universities and uses Web sites that cater to minorities for recruiting.

Successful companies also tailor their messages to their markets. "We try to coordinate our approach with the target audience," says Baker. That includes using specialized ads and collateral materials that are culturally relevant to the segments to which he is appealing, he explains.

EMPLOYEE REFERRAL

Probably the strongest single means of recruiting minorities to IT is through other minorities. "Every top talent diversity candidate you hire will bring you additional top talents," says Thompson.

Hall agrees. "We have found that talented individuals tend to associate with other talented individuals," he says. "Using associate referrals is a very impactful way to identify candidates. We use it to the greatest extent possible."

Marriott has a formal referral program with cash awards. "So there is responsibility all across the business to recruit," Hall says.

At Allstate, the employee-referral program is used so widely that it's been responsible for the recruiting of about 40% of new hires, says Baker. Allstate also has a strong community presence. "I get phone calls all the time from employees who say, 'My church is hosting an event. Come and set up a booth about openings at Allstate,' " Baker says.

COMMUNITY SERVICE

Through community service, companies can do good while attracting potential hires. At Marriott, for example, employees devote one workday each year to causes such as Habitat for Humanity International Inc., Children's Miracle Network or local events in the surrounding communities. "I've done everything from digging fence posts to helping to refurbish a local amusement park," Hall says. He notices that interest from minority candidates usually increases markedly after these activities.

ACCOUNTABILITY

Backing up diversity talk with real accountability makes a difference. At Bank of America, diversity targets are an integral part of each manager's performance and compensation plan, Thompson says. "We have accountability from the CEO straight down."

That accountability not only affects the decisions people make on the job, she says, but it also sends a message to minority candidates that the company means what it says. "Diversity candidates — and I was one — love knowing you have that accountability all through the organization right to the top," she says.

The same is true at Delta Technology, where managers are measured on their ability to create and maintain a diverse workforce, says Tahvonen. "Our performance standards allow an objective review of performance," he says.

Progress is carefully measured at Marriott, says Hall. For example, over the past five years, his IT division has increased its total minority representation by more than 5%, although the size of the division overall has decreased by 14%. "So at a time when our head count has gone down, our minority representation is going up," he says. During that period, Marriott increased the number of black senior-level tech associates by more than 100% and promoted seven to director-level positions, he says.

Companies say that once they begin to see progress in diversity, others notice, and then it snowballs. "External recognition helps," says Baker. "When we're named a top company for diversity, people see that." Hall agrees. "Marriott has been recognized by organizations like BDPA, and that helps us reach potential candidates. Generally, the number of e-mails and phone calls from interested candidates will increase because they read the articles." 49738

Diversity Recruiting Web Sites

AISES.org (American Indian Science and Engineering Society)

AsianAvenue.com

BDPA.org (Black Data Processing Association)

BlackPlanet.com

CGSM.org (Consortium for Graduate Study in Management)

MiGente.com

NSBE.org (National Society of Black Engineers)

SHPE.org (Society of Hispanic Professional Engineers)

Tips from the BDPA

Milt Haynes, immediate past president of the Black Data Processing Association, offers three tips for recruiting and retaining black IT talent:

1 **The best way is to demonstrate a commitment to diversity in the senior management ranks.** This includes providing employees with role models who are visible and actively involved in community outreach programs and diversity volunteer initiatives.

2 **Recruit through historically black colleges and universities, and associations like the BDPA.** These are the best places to find highly qualified African-American candidates.

3 **Provide competitive salaries, attractive fringe benefits and open access to promotional opportunities.** Companies that retain the best-qualified talent over time understand that it's very important to do this.

DON'T MISS *THE* IT EVENT OF THE YEAR!

JOIN THE ITIL REVOLUTION!

Attend this event and we'll show you how to use the best practices found in the Information Technology Infrastructure Library (ITIL) - the world's most credible IT service management framework - to "revolutionize" your IT organization.

But, you don't have to take our word for it. Already tens of thousands of IT professionals from world class organizations have experienced powerful results! Now, it's your turn!

If you're new to ITIL and want to learn about it, contact Pink Elephant today.

ARE YOU READY TO CHANGE YOUR IT WORLD?

Now in its 9th successful year, this conference features 9 tracks with over 80 sessions, including more case studies than ever before.

"Best investment of my time in a conference setting!" Patti Moriarty, Nordstrom

Early Bird! Register by November 30, 2004

9TH ANNUAL INTERNATIONAL

IT SERVICE MANAGEMENT CONFERENCE & EXHIBITION

ORLANDO FEBRUARY 6 - 9, 2005

EXCLUSIVE KEYNOTE!

SIR TIM BERNERS-LEE

Inventor of the World Wide Web

Named One Of Time Magazine's 100 Greatest Minds Of The 20th Century

PINK

CHANGE THE WORLD: JOIN THE ITIL REVOLUTION

Pink Elephant is a world leader in ITIL Education, Consulting and Managed Services

www.pinkelephant.com 1-888-273-PINK

SPONSORS

SupportSoft · NETWORKD · RELICORE · netiq Work Smarter. · ca Computer Associates · assyst by AXIOS SYSTEMS · exin · MARVAL · FrontRange SOLUTIONS · Peregrine

EXEC TRACK

National Medical Taps Masters, Hall

National Medical Health Card Systems Inc. in Port Washington, N.Y., said it has named health care industry veteran BILL MASTERS CIO. Masters will oversee the company's IT infrastructure and advance its use of IT to streamline acquisition integration. Prior to joining NMHC, Masters was vice president of health care business solutions at CVS Corp. He has also held senior IT positions at Reliable Drug Stores Inc., Rite Aid Corp. and Begley Co. The company also appointed AGNES HALL president of Integrail, NMHC's informatics company, which delivers health care benefit/risk management software.

N.Y. Times Names Thurm Its CIO

The New York Times Co. announced that DAVID A. THURM, vice president for real estate development, has been named CIO of the company and *The New York Times* newspaper. He will report to Leonard P. Forman, executive vice president and chief financial officer, and to Scott Heekin-Canedy, president and general manager for *The New York Times*. Thurm will continue to be responsible for overseeing the construction and development of the company's new headquarters in Manhattan and for other building projects. Previously, he served as chief operating officer for New York Times Digital.

Christopherson CTO At Health Language

Health Language Inc., a supplier of medical technology in Aurora, Colo., announced that JOHN CHRISTOPHERSON has been hired as chief technology officer. Prior to joining HLI, Christopherson was vice president of application architecture at McKesson Provider Technologies. He has also served as vice president of corporate systems at UnitedHealthcare.

BARBARA GOMOLSKI

What to Tell The Kids

A GROUP OF COLLEAGUES and I were talking during a conference call the other day about the IT job market. Many of us have kids who are starting to think about colleges and professions. Someone asked the group, "Would you advise your kid to go into IT today?" The majority of people on the call said no. This is just anecdotal evidence of what is blatantly obvious to most of us: The job market for IT professionals isn't what it used to be.

BARBARA GOMOLSKI, a former *Computerworld* reporter, is a vice president at Gartner Inc., where she focuses on IT financial management. Contact her at barbgomolski@yahoo.com.

Let me be clear. The tenor of that recent call with my colleagues was not totally negative toward IT careers. Many of the people on the call said they wouldn't discourage their kids' interest in IT. These parents would strongly caution their children about their course of study, however. They would advise their kids to be very clear about what they wanted to do in IT rather than just assume that their computer science degrees would open all doors.

To be sure, there are fewer IT positions available today than there were just five years ago if we consider traditional IT roles, such as infrastructure management, support and programming. What's more, the jobs that are available in IT increasingly require skills that aren't taught as part of the computer science curriculum. This is in stark contrast to when I graduated from college. All the computer science majors I knew had secured high-paying jobs at Fortune 100 firms prior to graduation.

But the changes in the IT job market affect all IT professionals, not just those new to the field. So, what are the chief differences today? Here's how I see it:

- The days of studying computer science, getting an entry-level job as a programmer and moving up the IT ladder are gone. First of all, there are fewer programming jobs available now, because of offshore outsourcing.

Second, we can no longer assume that a general computer science degree is going to prepare graduates for the IT job market. Certainly, some firms are still hiring new talent through the programming ranks, but this process is not nearly as common as it used to be.

- As a result of automation and the spread of consumer IT, we don't need as many people as we once did to manage IT systems. Technology is more standardized, and end users are more familiar with technology.
- The increasing pace of business, industry consolidation and globalization means that most of us will move from company to company during our careers. All professionals — not just those in IT — will gather the skills they need from multiple employers.

The IT job market is not all bad news, though. There are opportunities in certain areas, and even growth. Here are some of them:

Business process design and management. Business process design — something IT has always been expert at — is starting to surface as a new competency for IT professionals. Their prowess at process design comes from getting to see entire business processes as they build IT systems. Enterprising IT professionals are capitalizing on this by driving process improvement in their own organizations and making process design and management a key part of their jobs.

Information management. Companies are generating more and more data about their customers, partners and competitors. Organizations are going to need individuals who can help turn this data into usable information. This includes experts in customer relationship management, business intelligence and search technologies.

Relationship and vendor management. As the multisourced IT environment has gained ground, it has become clear that IT organizations need people who can negotiate and manage contracts and who can help select and manage IT service provider partners.

Finally, traditional IT jobs (such as programming and infrastructure management) are not going away. Though there may be fewer of them, we'll still need people in these positions for the foreseeable future.

The IT job market is changing, and it can appear bleak. But I'm actually pretty optimistic about the prospects for IT-savvy professionals. However, future IT job seekers will need to do more than study computer science at a reputable college to succeed. **49732**

WANT OUR OPINION?

For more columns and links to our archives, go to **www.computerworld.com/opinions**

Thrifty Storage Strategies
To maximize storage savings, Glenn Exline and other IT pros are homing in on long-term planning initiatives. **PAGE 36**

Secondhand Savings
Buying used storage equipment is cheaper than buying new. But there are risks involved. **PAGE 40**

Long Live Tape
Columnist Mark Hall was planning to write about the impending demise of tape. But then he looked a bit closer and discovered that it has a bright future. **PAGE 46**

Stretching Your Storage Dollars

SPECIAL REPORT Cost-effective strategies to help you cope with soaring demands.

BELLE MELLOR

EDITOR'S NOTE

LET'S TAKE IT BY THE NUMBERS: When Sage Research asked 104 executives which technology areas are the greatest sources of pain in their organizations, they ranked security No. 1 (no surprise there) and storage No. 2.

Why is storage so painful? Maybe it's because storage demand is doubling every year and IT budgets certainly aren't. An IDC study says the demand is fueled by growth in e-mail, data warehousing and CRM, not to mention regulatory requirements. The effort to archive boatloads of e-mail (with those giant attachments) is especially costly: The Yankee Group says a typical corporation with 5,000 employees will accumulate nearly 4TB of e-mail every year, thus requiring the services of at least one full-time storage administrator!

This helps to explain why, in an exclusive survey of 91 IT executives, *Computerworld* found that the top three storage headaches are data growth, cost and insufficient staffing. This special report tackles the issue in the middle — cost — by identifying thrifty strategies for the storage manager, from big-picture, long-term plans that reduce the total cost of ownership to short-term ideas like buying secondhand gear.

KNOWLEDGE CENTERS ONLINE
For storage news and analysis, visit our Storage Knowledge Center:
QuickLink k1700
computerworld.com

Our survey also found that the top-of-mind storage topics for the next few months are disaster recovery and storage security, which means we've come full circle: Security and storage are the top technology issues in the IT field today, no question about it.
49814

Mitch Betts is Computerworld's *executive editor. Contact him at mitch_betts @computerworld. com.*

Thrifty Storage

Long-term planning is the ticket to big savings.

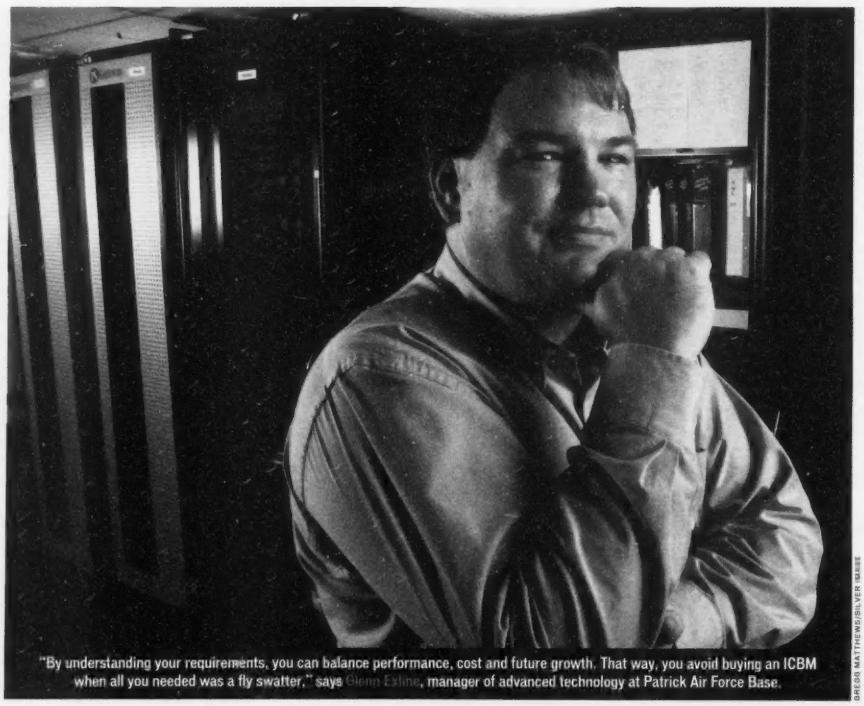
By Drew Robb

THERE ARE DOZENS of ways you can shave a little here and a little there when it comes to overall storage costs. But at the end of the day, storage is still going to be a whopping part of you budget. That's why companies that are serious about real savings take a long-term strategic view and push their plans through to completion.

Take the case of Cisco Systems Inc. Utilization of just 20% to 30% on a direct-attached storage architecture was costing a fortune. "With no accurate method for tracking consumption and no way to plan for growth, our storage spending grew out of hand between 2000 and 2002," says Bill Williams, manager of enterprise storage operations. "That's why we decided to focus on achieving a consolidated storage model to raise utilization levels and lower TCO."

In a relatively short time, the company has taken major strides toward achieving that goal. In 2001, Cisco's 750TB of data was almost all direct-attached storage, with a few storage-area network islands interspersed. Today, Cisco has 2.1 petabytes of managed data, but only 20% of that is direct-attached storage; 55% is on a Fibre Channel SAN, and 25% is network-attached storage. This shift involved migrating nearly 1 petabyte of data to Cisco's MDS 9500 Series Multilayer Directors and consolidating 80 smaller EMC Corp. frames to eight large ones.

Cisco's experience is far from uncommon. Escalating storage costs are pushing most companies to look for cost-saving and -avoidance strategies. While some save cents here and there on quick fixes, the real savings come through long-term planning. Large organizations, in particular, are finding that the sheer volume of data that exists in disparate systems necessitates the rearchitecting of the storage infrastructure.



"By understanding your requirements, you can balance performance, cost and future growth. That way, you avoid buying an ICBM when all you needed was a fly swatter," says Glenn Exline, manager of advanced technology at Patrick Air Force Base.

GREGG MATTHEWS/SILVER IMAGE

Taking the Long View

By consolidating storage and migrating to networked storage, Cisco has taken annual total cost of ownership from 40 cents per megabyte to 10 cents per megabyte, says Williams. And there may still be room for improvement. Cisco has a target of 8 cents per megabyte this year.

Other organizations are taking a similarly long-range view to slash their storage budgets. The 45th Space Wing of the U.S. Air Force, for example, experienced problems with its direct-attached storage architecture. Backups were slow, systems took too long to recover, and performance suffered badly.

The 45th Space Wing has spent the past several years implementing a centralized storage environment consisting of BrightStor Enterprise Backup software from Computer Associates International Inc. and storage hardware from Brocade Communications Systems Inc., EMC and Exabyte Corp. By pooling storage in large repositories, capacity increased by 600% to 6.5TB, file and print servers were reduced by 33%, and backup times decreased by 83%.

"From 12 hours per night for backup, we are down to four hours," says Glenn Exline, manager of advanced technology at Patrick Air Force Base. The economic payoff has been impressive. The costs to date have totaled about $1.4 million, he says, while the savings are about $2 million.

To prevent storage costs from mushrooming, Exline stresses understanding the specific SAN design. Almost all

COMPUTERWORLD

Executive Bulletin

Our Hottest Security Tips

Sage advice for protecting corporate assets in a dangerous world.

Introduction 2
Know Thy Users (Identity Management) 3
Evaluate Outsourcing Partners 5
Strengthen Security During Mergers 7
Thwart Insider Abuse 9
Privacy Protection, Step by Step 11
Plug IM's Security Gaps 13
Investigating Computer Crimes 15
Boost Your Security Career 17

The Grand Challenges

A RECENT SURVEY OF 104 EXECUTIVES fingered IT security as the No.1 technology pain point in corporations. Why? For one thing, the threats come in many forms and from many directions: disgruntled employees, fired employees, clueless employees who succumb to social engineering, passwords left on Post-it notes, wide-open instant messaging and increasingly powerful hacker tools in the hands of teenagers.

"Companies must understand that the corporate perimeter dissolved with the very first Internet connection," says Lynne Ellyn, lead author of a security report from Cutter Consortium in Arlington, Mass. "Every business-to-business supply chain connection, every Internet storefront, every reverse auction that a company puts into operation opens the corporation's virtual doors. Once connected to the World Wide Web or the Internet, a company actively occupies a virtual space that is peopled with competitors, terrorists, children, environmentalists, lawyers — every segment of society — or, actually, every segment of nearly every society on earth."

New security and privacy laws are being passed, and the risk of cyberterrorism looms. Plus there are seemingly mundane issues: The telecommuter working at his kitchen table from a home PC — connected to your corporate network — could be the weakest link in your security defenses. "We got hit with the Blaster worm when a home user tapped into a machine he didn't really require access to," says Rich Dase, technology director at Knowles Electronics LLC in Itasca, Ill.

It's no wonder that some companies throw up their hands and let contractors that have security expertise — known as managed security service providers — handle the work. The threats are "outpacing the enterprise's ability to keep up with the latest countermeasures and techniques to thwart attacks," according to a recent report by The Yankee Group. The researchers predict that enterprises will outsource 90% of their security activities by 2010.

But the outsourcing approach is no panacea — it has it's own challenges. And many corporations don't want to turn the keys to the castle over to an outside firm. "You cannot outsource risk. You should never outsource everything," says Yankee Group analyst Eric Ogren.

Insider Threats

One of the biggest security threats comes from inside the organization. According to the American Society for Industrial Security, current and former employees and on-site contractors with authorized access to facilities and networks continue to pose the most significant risk to intellectual property such as research data, customer files and financial information.

It's especially important to lock down security during a merger. U.S.-based multinational companies plan to increase their merger and acquisition activity over the next two years, with 70% expecting to be involved in such deals in that period, according to a recent PricewaterhouseCoopers Barometer Survey of 170 executives. That will mean a lot more work for chief security officers — before the deal is signed and afterward, when security technologies and policies have to be integrated. You'll need to ensure that data, networks and systems remain as secure as possible during the often turbulent times that accompany a merger or acquisition.

For example, you'll need to analyze the security policies and technologies at the other company and determine how vulnerable it is — well before the actual merger. "Spend a lot of time learning about the company and its culture, where it does business, whether security [management] is centralized or decentralized, and how the company values security," says Bobby Gillham, manager of global security at ConocoPhillips in Houston, who headed security for Conoco during its 2002 merger with Phillips Petroleum.

And you'll need to anticipate social engineering and other security threats from disgruntled employees at both of the companies involved. As soon as an employee has been notified about a layoff, cut off access to all critical services and applications. "You need to pay particular attention to protecting against people walking out with proprietary information," Gillham says.

Hole in the Firewall

Meanwhile, knowledge workers are using consumer-oriented instant messaging applications, opening up your network to more possible mischief. Gartner Inc. has identified IM as one of the top 11 security issues for the corporation. "IM, by its very nature, punches a hole in the firewall,

Pain Points

Which technology areas are the greatest sources of pain in your organization today?

1. Security
2. Storage
3. Software license management

BASE: 104 C-LEVEL EXECUTIVES AT U.S BUSINESSES WITH MORE THAN 100 EMPLOYEES
SOURCE: SAGE RESEARCH INC., NATICK, MASS., JUNE 2004

Advice from Your Peers

A sampling of the practical tips you'll find in this report:

ENFORCE a "lowest privilege level" policy for information assets, which means employees get access only to the data they need to do their jobs. No one needs access to everything.

CHANGE systems administrator passwords when key IT staff members leave the company.

SET a time limit – like 15 minutes – for responses from security services firms.

ANTICIPATE social engineering and other security threats from disgruntled employees at both of the companies involved in a merger.

BLOCK file transfers for users of consumer instant messaging.

HIRE trained investigators for computer crime cases. Even great in-house systems administrators can unwittingly foul up the evidence needed for prosecution.

MINGLE with the opposition at the annual Def Con hacker conference in Las Vegas to find out what they're up to now.

and that opens up the possibility of inviting in a dangerous worm," says Internet security expert Douglas Schweitzer.

Battling this onslaught of security problems will require not only savvy but also money. "Back in the good old days, security consisted of a few firewalls and some virus protection," says veteran CIO Doug Lewis. "The threats have outgrown those simple defenses, and the cost has outgrown the approval level of the chief security officer and, sometimes, that of the CIO." That means Fortune 500 companies are finding themselves with security expenditures that require CEO and even board-level approvals.

Boosting Your Budget

In this report, Lewis provides a brilliant plan for developing a rock-solid business case for boosting your IT security budget — with a credible return on investment that even the chief financial officer will love.

Overall, the report has dozens of practical tips to help you manage the IT risks faced by the modern corporation. But before you implement any of them or buy another security product, do one thing: Stop to identify the three biggest security risks your company faces — whatever would bring your company to its knees. They will vary, depending on your industry and business model. Is it theft of credit card numbers? Embezzlement? Privacy violations?

Be sure to address those high-risk areas first, before looking at more exotic problems. Take care of the basics: passwords, patches, employee training, antivirus software and access controls. And if you can't keep up, consider outsourcing.

Risk – it's everywhere. And no one knows that better than IT security professionals. Disgruntled employees, fired employees, clueless employees who succumb to social engineering, passwords left on Post-it notes, wide-open instant messaging and increasingly powerful hacker tools in the hands of teenagers – this bulletin will help you address those risks with sage advice for protecting corporate assets in a dangerous world.

FREE DOWNLOAD: "Our Hottest Security Tips"
For a limited time, get this full report (a $49.95 value) for free, compliments of Cisco.
www.computerworld.com/securitytipsbulletin

QuickLink a5020

2:07PM LOG IN TO HOT SPOT 2:08PM NETWORK SECURES THIN AIR 2:09PM TRANSMIT FILES THROUGH THIN AIR 2:25PM UPDATE PURCHASE ORDER 2:35PM EXPENSE COFFEE ORDER

The more freedom you give employees to work anywhere, the more you can achieve. That's good. But, at the same time, the more you expose yourself to intruders and worms. That's not so good. How far can a network travel to protect your office? Now, the answer is everywhere. Cisco networks, with integrated wireless security, protect mobile workers who constantly move outside the safety of the corporate network. So information is secured. No matter where it exists. To learn more about how Cisco can help plan, design and implement your network security, visit cisco.com/securitynow. **SELF-DEFENDING NETWORKS PROTECT AGAINST HUMAN NATURE.**

CISCO SYSTEMS

THIS IS THE POWER OF THE NETWORK. NOW.

©2004 Cisco Systems, Inc. All rights reserved. Cisco, Cisco Systems, Cisco IOS, and the Cisco Systems logo are registered trademarks or trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and certain other countries

Strategies

Penny-Pinching Tips

INTRODUCE simple file/print and Web applications to Linux, gain some experience, and then gradually execute a small-scale Linux SAN.

INVESTIGATE archiving systems to take inactive data off production systems to eliminate as much as 60% of your nightly backup workload.

JOIN a strong user organization such as the Association of Storage Networking Users (*www.asnp.org*) and find out how to reduce your storage costs by networking with your peers.

TRAIN everyone in storage a little every month. That can bring down your support costs considerably.

REQUEST proposals only for what you need and stick to it. Don't be swayed by the latest vendor bells and whistles. Often, they are the equivalent of a car salesman talking you into an extra $100 a month for a better CD player, an extra cup holder and a sunroof. Do you really need them?

SCHEDULE defragmentation before servers are backed up. It's a great way to speed backups and reduce costs. But don't use the built-in tool that comes with Windows. Get a networkable defragmenter such as Executive Software International Inc.'s Diskeeper.

WRITE requests for proposals that are neither too general nor too specific. Too specific and costs can mount. Too general and you end up with software that doesn't fit your needs or that lacks business value.

DECIDE if you actually have the time, expertise and resources to competently evaluate vendors or implement storage projects. If not, farm it out to industry experts.

– Drew Robb

storage vendors have multiple tiers of products. "By understanding your requirements, you can balance performance, cost and future growth," says Exline. "That way, you avoid buying an ICBM when all you needed was a fly swatter."

A case in point: The smaller EMC Clariion array proved a better fit than EMC's high-end Symmetrix array. "There are lots of situations that call for larger systems, but they were overkill in our case," says Exline.

Surviving the Learning Curve

Choosing a system is a decision that can be made only after you do your homework. In reality, however, that may not be possible until you have completed your first SAN. And by then, it may be too late.

"Any enterprise must get a qualified VAR/integrator involved, as there is nothing like experience when it comes to SANs," says Steve Duplessie, an analyst at Enterprise Strategy Group Inc. in Milford, Mass. "There can be a ton of gotchas if you aren't prepared upfront."

Exline agrees. He's seen IT departments attempt huge storage projects with impossible deadlines. There is a learning curve that has to be respected, he says, and he preaches training on new storage products. "By being self-sufficient to a large degree, we save a lot on support," says Exline.

Another way to reduce costs is through consolidation. Golden Gate University in San Francisco is nearing the end of a three-year migration of its storage environment from six operating systems to Linux and Windows. The university is also consolidating servers, databases and enterprise resource planning systems.

"Leveraging Linux with an enterprise storage tier has reduced server acquisition costs by over 20%," says Keith Rajecki, Golden Gate University's IT infrastructure manager. "TCO in our old storage environment was 10 times greater than it is today."

He reports that maintenance would have cost 250% more on a Sun Solaris environment than it does on a Dell/Linux combination. IT operating costs are down 40%, the number of servers has been cut from 100 to about 50, and head count is 20% lower.

"Consolidation and standardization combined with a focus on storage management as an ongoing activity will enable most organizations to cut storage costs," says Rajecki.

No End in Sight

Simple economics dictates planning for the long haul. Cisco, for instance, recently consolidated its storage budget across all business units and has a single budget for all enterprise storage needs. "Because storage is such a major cost, it requires long-term planning to keep costs under control," says Cisco's Williams.

Similarly, the 45th Space Wing is refusing to rest on its storage laurels. It implemented backup to virtual tape via Alacritus Software's Securitus virtual tape appliances. It also added another 28TB of mixed Fibre Channel and ATA storage to support Exchange 2003 clusters, virtual tape backup and cross-site mirroring (using EMC's SnapView and SAN Copy). New tape libraries from Qualstar Corp. were added using Super Advanced Intelligent Tape technology to increase per-tape density and reduce off-site vaulting charges.

"Estimated ROI is 14 months, with a three-year savings of approximately $400,000 just in tape and vaulting charges," says Exline. **49416**

Robb is a freelance writer in Los Angeles. Contact him at drewrobb@attbi.com.

MORE COST-CUTTING TIPS

Industry experts say reducing storage costs is a step-by-step process that begins with planning that is diligent and ongoing. Here are five key steps:

QuickLink 32849
www.computerworld.com

iSCSI Brings Lower-Cost Storage Networks

INTERNET SCSI, OR iSCSI, was designed to offer the advantages of storage consolidation, without the headache of Fibre Channel devices and cabling, by enabling block-level data delivery over IP networks.

"Companies should be running, not walking, to iSCSI," says Steve Duplessie, an analyst at Enterprise Strategy Group. "The payback is so strong and so fast that enterprises will look silly if they wait. And iSCSI is driving prices down for [Fibre Channel] networks."

One convert is Denver Health Medical Center. Its IT environment consists of 16 buildings connected via Gigabit Ethernet, 22 community health clinics connected via Sonet, 166 clustered servers (125 Windows, 20 Unix and various others) and two SANs – a Fibre Channel SAN and an IP SAN.

"We found FC SANs to be expensive to implement, and they required specialized training and technicians," says Jeff Pelot, chief technology officer at Denver Health. "An IP SAN is so much more affordable, and implementing one is like building something with Lego."

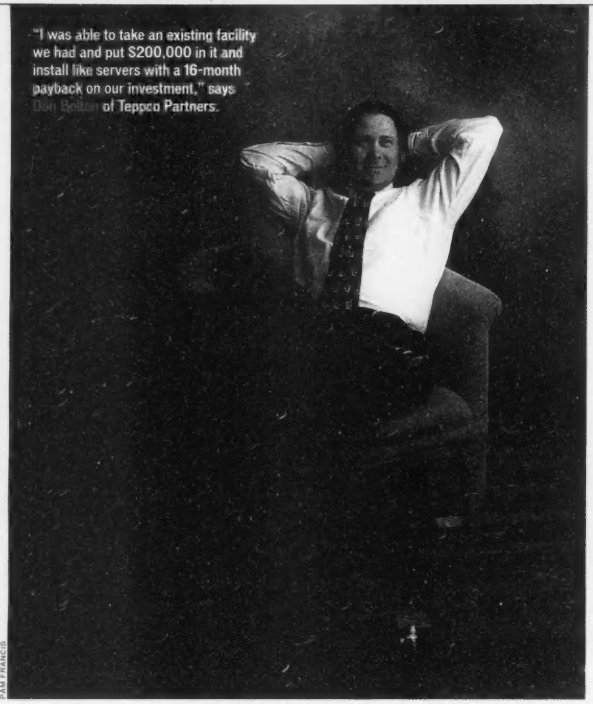
Pelot says he doesn't think his facility requires FC buildout, especially now that IP technology has matured. However, Denver Health fully intends to maintain its existing SAN. With the infrastructure in place, it makes no sense to eliminate it. Instead, the facility chose to expand its storage platform with an IP SAN from LeftHand Networks Inc. in Boulder, Colo.

Glenn Exline, manager of advanced technology for the Air Force's 45th Space Wing, points out that the big advantage of a Fibre Channel SAN is that it removes storage and backup traffic from the network. By doing so, his organization sped up its existing network.

"Allowing user access to the same data network that is harnessed for storage is a big mistake," says Exline.

However, Pelot says that performance turned out to be far less of a problem than many feared. "Although I/O is very slightly down compared to the FC SAN, the users have never noticed the difference," he says.

– Drew Robb


"I was able to take an existing facility we had and put $200,000 in it and install like servers with a 16-month payback on our investment," says Don Bolton of Teppco Partners.

PAM FRANCIS

Long Distance, Short Money

Storage over IP provides a cheaper, faster alternative for data backup. By Lucas Mearian

NATURAL DISASTERS and government regulations have put pressure on companies to back up data farther away from their main data centers than they do now, but achieving that goal can be pricey. Tape is one option, but it's slow to restore. Dedicated networks can replicate data over a WAN, but at a bandwidth price.

In their quest for cheaper alternatives, some companies are turning to a still-developing option. Storage over IP, or the replication of block-level data over leased virtual private networks, allows users to select the type of wide-area service that best meets their budget and application requirements.

"It's a lot faster than tape. And IP is a lot less expensive than a dedicated line," says James Opfer, an analyst at Gartner Inc.

The three main long-distance transmission protocols — Internet SCSI (iSCSI), Fibre Channel over IP (FCIP) and Internet Fibre Channel Protocol — are all significantly different, but they provide a common function: transporting block-level storage over an IP network, which allows administrators to use inexpensive Ethernet-TCP/IP networks to transport and access storage over LANs, WANs or metropolitan-area networks.

ISCSI, which transmits block-level data directly over Ethernet, is primarily a server-to-storage interconnect within the data center. It takes advantage of ubiquitous Ethernet networks to consolidate Windows and Linux server backups by connecting LANs to storage-area networks (SAN). New vendors are now offering arrays that use iSCSI as a tunneling protocol to transmit over long distances.

Savings Spots

The greatest savings in using IP to transport data between data centers comes from reduced bandwidth. Long-distance replication of block-level data can use IP, Synchronous Optical Network (Sonet) and Asynchronous Transfer Mode (ATM) networks to transmit data, with little difference in price as long as it's not a dedicated line.

"It's not the hardware. Every time I talk to people, they say it's the cost of bandwidth services," says Opfer.

But exact savings are hard to pin down: Opfer says bandwidth costs can vary widely by region. If you're using "dark fiber," or surplus fiber-optic cable, "you're going to get wild swings in the price," he says. And with IP, there's no need to hire Fibre Channel network administrators or buy switches or host bus adapters to create the network interface.

But financial firms and other companies dealing with sensitive data are still squeamish about adopting a storage-over-IP framework, says Dianne McAdam, an analyst at Data Mobility Group LLC in Nashua, N.H. "What I do see changing is the small to medium-size businesses, where in the past they looked at doing replication and then got the price tag and said, 'Oh my God,' " she says.

Some large companies say the cost benefits outweigh the risks. For example, Don Bolton, manager of infrastructure and systems services at Teppco Partners LP, an energy company in Houston, understands costs issues associated with disaster recovery. Teppco had been paying $250,000 to $500,000 a year to SunGard Data Systems Inc. in Wayne, Pa., to ensure that should the company's systems go down, they could power up in another region without losing data.

Earlier this year, Bolton says, he decided that Teppco could perform that chore itself by replicating mission-critical, block-level data via a T1 line between data centers in Houston and Tulsa, Okla. — a distance of about 500 miles. That move has cut his costs by more than half with a quick return on investment. "I was able to take an existing facility we had and put $200,000 in it and install like servers with a 16-month payback on our investment. And it's allowed us to grow our infrastructure," Bolton says.

Teppco asynchronously replicates block-level data from Oracle and SQL databases that reside on clustered arrays from Network Appliance Inc. that use NetApp's SnapMirror application. "It's pretty interesting technology. If I was a superlarge shop at Continental Airlines or something, with hundreds of terabytes, I don't know if this would be the solution. But with this size, it is perfect," Bolton says.

In asynchronous mode, SnapMirror provides read-only, online replication of a source file system (volume or quota tree level). In the event of a disaster, Bolton says the mirror site could be used as the primary, converting the SnapMirror replica into a writable file system and replacing the original.

IP Payoff

Edward Jones & Co. has begun to reap the rewards of three years of work and an $80 million investment in a storage-over-IP network [QuickLink 49629]. The system is replicating up to 700GB of data daily to a fully redundant backup site located 1,600 miles away from the brokerage's main data center, near St. Louis. Edward Jones has created a secondary site in Tempe, Ariz., that's a replica of the primary data center, complete with 450TB of SAN-based data.

Bill Hayden, director of data services at Edward Jones, which is using FCIP over ATM to tunnel its data across the U.S., says prices have continued to drop on network bandwidth. "It doesn't matter whether it's running IP, Sonet or ATM," the prices are the same, he says.

The payback? All of Edward Jones' Oracle databases are replicated nationwide in under five seconds. File services are replicated every four minutes, and mainframe databases are typically replicated in 30 minutes. The company says it can flip a switch and begin using its secondary site as its primary one.

"Our sticking point is our [VSAM flat files] on our mainframe," Hayden says. VSAM flat files still take four hours to replicate, a problem that Hayden says could be resolved by updating Edward Jones' EMC Symmetrix arrays and replication software.

"There are always issues," he says. "We're always looking to get the data there faster and looking for ways to get the data to the point where we can update it at either site." 49821

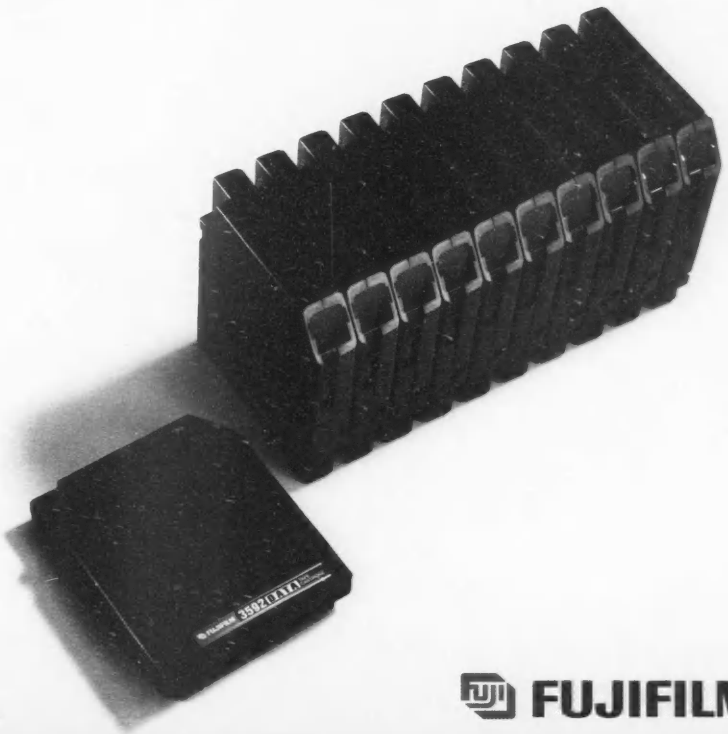
BRAND NEW. NOT NEW BRAND.

Introducing the Fujifilm 3592 enterprise-class data storage tape.

While Fujifilm 3592 is a brand new addition to our full line of superior quality data storage media, it comes from a company that is anything but a new brand. In 1995, our technology enabled the first gigabyte-class metal particle enterprise 1/2" tape. Since then, steady innovation has culminated in a high-end 1/2" tape with NANOCUBIC Technology, the magnetic coating technology leveraged by world-leading hardware manufacturers in development of their latest-generation enterprise-class drive systems. Specify Fujifilm on your next high-end tape order. It's the brand that other brands trust.

To find out more about our complete line of reliable data storage media, visit us at: www.fujifilm.com

nanocubic



© 2004 Fuji Photo Film U.S.A., Inc. Trademarks are the property of their respective owners.

FUJIFILM

BELLE MELLOR

Second-Hand Savings

Buying used storage equipment is cheaper, but riskier, than buying new gear. **By Mary Brandel**

AT ATA AIRLINES INC., the practice of buying refurbished storage systems started small, with the purchase of a workgroup-size disk array. Over the past six years, the $1.2 billion airline bought more and more used storage equipment, including enterprise-size storage systems, tape libraries and eventually Fibre Channel storage-area networks. Today, "there really isn't a case where we wouldn't consider previously owned storage systems," says Paul Smith, director of information services at Indianapolis-based ATA.

The result: savings that add up to at least 50% off list price for used storage components and 60% to 70% savings for used storage systems.

"Why pay top dollar when you can let someone else take the hit on new equipment?" says Chuck Copell, manager of hardware support services at Affiliated Computer Services Inc., a $4 billion outsourcer in Dallas. "Storage hardware depreciates as fast or faster than an automobile. Whenever possible, I like to buy used equipment."

The hottest used items include tape and optical libraries, as well as other archive and backup products, where performance is less critical and the obsolescence cycle is slower, according to resellers. But the market for newer equipment, such as Fibre Channel SAN switches, is also active, and midrange disk arrays, such as IBM Shark's and Hitachi Data Systems Corp.'s Thunder system, also sell well.

The benefits go beyond cost savings to include faster acquisition cycles and more-flexible maintenance programs. But there are risks involved. Before doing business with storage remarketers, users should consider the answers to these common questions about secondhand storage equipment.

1 Is It Reliable?

This is perhaps the first question asked by people who have never purchased secondhand storage. But experienced users have no reservations about reliability, as long as they're purchasing from a reputable vendor that sets up, tests and refurbishes the systems. The vendor should also offer a warranty that the equipment is in working condition upon arrival at the customer site and possibly even for 30 days until the system comes under a service contract with the manufacturer or a third-party provider. Some resellers will also offer longer warranties on certain equipment for a higher price.

In any case, "you have to be comfortable with the vendor you choose," says Smith. "It could make all the difference if the system has been in a climate-controlled environment as opposed to a hothouse where the disks have been spinning in 100-degree heat."

2 Can I Get a Service Agreement?

It's important to determine beforehand if the equipment you're buying is eligible for mainte-

Continued on page 42

Meet the Winners at SNW

"Best Practice" Storage Users to Be Announced October 25th at Storage Networking World Conference

COMPUTERWORLD STORAGE NETWORKING WORLD
SNIA
Best Practices IN STORAGE
AWARDS PROGRAM

AWARDS PROGRAM EXCLUSIVELY SPONSORED BY:
EMC²
where information lives

Storage Networking World (SNW), in conjunction with Computerworld and the Storage Networking Industry Association (SNIA), proudly presents the fifth SNW "Best Practices in Storage" Awards Program. This program honors ten IT user "best practice" case studies selected from a field of qualified finalists.

Two awards will be presented in each of the following five categories:

Systems Implementation

Recognizes the successful design, implementation and management of an interoperable environment. This category also demonstrates the ability to source from multiple vendors.

Storage Reliability and Data Recovery

Acknowledges implementation strategies and programs to insure highly available information and data access.

Data Lifecycle Management

Exemplifies solutions and processes to manage the information over its lifecycle.

Industry Regulation Compliance and Corporate Governance

Spotlights solutions being deployed to meet or exceed industry regulations specified by the SEC, Patriot Act, HIPAA, Sarbanes-Oxley, DoD, and CFR.

Innovation and Promise

Successful "pioneering" of leading/bleeding-edge storage networking technology will be recognized in this category.

COMPUTERWORLD STORAGE NETWORKING WORLD
SNIA
October 25-28, 2004 · JW Marriott Grande Lakes Resort · Orlando, FL

For information on, or to register for Storage Networking World visit **www.snwusa.com**

CUSTOM PRODUCED BY:
COMPUTERWORLD
The Voice of IT Management

CO-OWNED AND ENDORSED BY:
SNIA

Stick With What You Know

WHEN ATA AIRLINES purchased its first SAN, the equipment wasn't available on the refurbished market, and looking back, that's a good thing, says Paul Smith, director of information services.

After installing the new equipment, the SAN didn't perform up to its published specifications, and the manufacturer had to be called in for assistance. "Having that extra layer of the remarketer could have made it difficult," Smith says. "We wouldn't have had the clout, and the problem may not have resonated with the vendor." The lesson: If you're working with an emerging technology or one you're not intimately familiar with, your risk factors rise.

Another point: In the refurbished market, you don't have the honeymoon period when you can call in all of the vendor's resources.

ATA bought its first SAN four years ago. Since then, Smith has turned to the refurbished market when he has needed an additional SAN array.

– Mary Brandel

Continued from page 40

nance from the original manufacturer or from a reputable third party. "Some of the big vendors like HP, IBM and Sun are very strict about what they will and won't support as far as the age of the equipment and the firmware and its interaction with their more modern equipment," Copell warns.

Vendors may also provide maintenance contracts more readily if you buy from an authorized reseller of their equipment. Otherwise, they may require a site visit and an audit to perform necessary upgrades or firmware changes — for a price, of course.

You should also ensure that all the drives within a storage system are original manufacturer drives, or the manufacturer won't place them under maintenance agreements, according to Robert Davie, founder of ITParade.com Inc., a Web-based marketplace for refurbished computer equipment in Cary, N.C. For example, a Sun Microsystems array must have all Sun-manufactured drives in it.

IBM is one of the only vendors with well-defined processes for servicing the secondhand market, says James Davie, a vice president at Canvas Systems, a reseller in Norcross, Ga. It offers a "banding process," by which IBM certifies that the system is "maintenance service qualified" at the time of the sale. The system arrives at the customer site with a silver band around it, IBM engineers implement the system, and IBM provides the maintenance contract. This comes at an additional cost of about $1,000, according to Doug Rengel, a consultant at Xerxes Computer Corp., a refurbished computer reseller in Bloomington, Minn., so customers might choose this option only for higher-end equipment.

Some companies, such as ATA Airlines, don't rely on vendors for service and instead maintain their equipment themselves. ATA even keeps its own inventory of spare parts. "We're an extreme case," Smith acknowledges.

Bruce Caswell, vice president of marketing at World Data Products, a refurbished computer reseller in Minnetonka, Minn., says roughly 80% of his company's customers put their hardware on a maintenance contract, while 20% are self-maintainers. Of those that opt for maintenance contracts, most turn to credible third-party providers such as Northrop Grumman Corp., DecisionOne, Storage Technology Corp. and General Electric Co. to lower their cost of maintenance.

3 Should I Expect Vendor Push-back?

Particularly if you're purchasing a high-end system, many vendors will try to dissuade you from purchasing refurbished equipment by threatening exorbitant "recertification" fees or even refusing to service it. "I know one large insurance company that got strong push-back from Sun at the CFO level and decided not to purchase refurbished because of that," says Robert Davie. On a StorageTek L700 tape drive, the relicensing fee can reach $2,200, he says.

According to many observers, the vendor with one of the worst reputations in this regard is EMC Corp. "EMC has a subtle way of controlling the market in its own used gear," says John Webster, founder of the Data Mobility Group LLC, a consultancy in Nashua, N.H. "They say that the microcode to run the machine is not transferable and that you need to buy a new microcode license — which, by the way, ain't cheap."

EMC defends its relicensing requirements. "Our systems are intelligent storage systems that have software incorporated into them, and it is standard practice throughout the industry that the software license doesn't get transferred when the hardware gets transferred," an EMC spokesman says. "The licensing also ensures that the product operates as it's supposed to for the customer."

It's important to keep in mind that these types of fees are negotiable, resellers say, and that salespeople can reduce or even waive them. A good negotiating point is to suggest that you might opt for third-party maintenance, meaning the vendor will lose the service revenue as well. Robert Davie recommends contacting the field service rep instead of the salesperson, since the service rep is typically compensated on the service contract revenue and is more likely to negotiate with customers to reduce relicensing fees.

Smith advocates having a frank discussion with your vendor about servicing issues. With his company's storage vendor, Hewlett-Packard Co., "it took some time," he says. "There were lightly intimated threats of refusal to put it under warranty and tack on recertification costs." How the vendor reacts, Smith says, can either cement the relationship or end it.

4 Will There Be Compatibility Issues?

One gotcha on used storage equipment is compatibility with newer equipment, particularly in the areas of firmware revisions and interface compatibility. "If you have the luxury of time, it's easy enough to take a look at your operating systems and firmware revisions and patch-level kits and determine whether the equipment will be an easy fit," Affiliated Computer Services' Copell says. "But around here, things are on a deadline mentality, and that's when you find problems."

In some cases, resellers load the latest firmware revisions onto the equipment they sell; in others, their tech support staffs can help with fixes when problems are discovered.

At ATA Airlines, Smith's staff conducts its own research into firmware requirements. "We need to be prepared to understand why you can have two disks that carry the same part number, and one works while the other doesn't," he says.

Also keep in mind that standards change. "You can mistakenly assume that a piece of old gear can do something that's commonplace today," says Marc Farley, president of Building Storage Inc., a consultancy in Saratoga, Calif. For instance, an older Fibre Channel host bus adapter might be available for $20, but it's useless if it doesn't support a fabric log-in, which most SANs use today.

5 Can I Trust the Remarketer's Staff?

The caliber of vendors in the refurbished market can vary widely, Smith says, and the best way to know what you're getting is to check the résumés of the technical staffers.

"We've relied on [World Data Products] heavily to ensure things work when they got here and do some integration," he says. "In essence, the remarketer's staff is an extension of your staff, so I'd advocate looking carefully at the vendor's hiring practices and the quality of their employees."

In a long-term relationship, a remarketer can help you decide what will work best with your environment and what options will save you the most money. "There are tons of prerequisites for purchasing storage — what are you attaching to, what storage adapters are you using, what SAN devices are you using," says James Davie.

"Sometimes, the people selling in the used market have no idea what they're promoting," Farley says. For instance, when he has purchased on eBay, he's been given data sheets that don't match the product being sold. "Clearly, they had no idea what they were doing, but they were sure eager to sell it," Farley says. **49422**

Brandel is a Computerworld *contributing writer in Grand Rapids, Mich. Contact her at mary.brandel@comcast.net.*

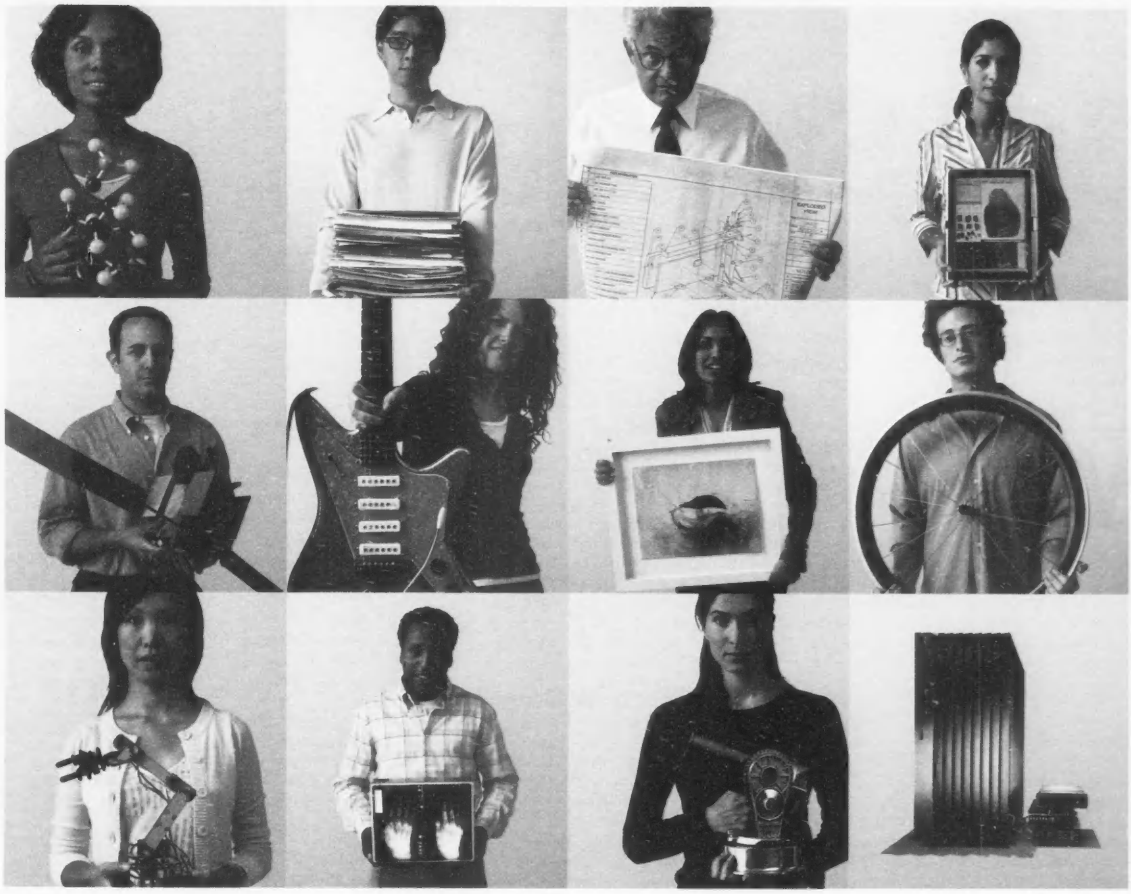
MARKET MEASURE

Although the size of the used storage market isn't easy to measure, one estimate puts it at about 5% of the overall used computer market, according to Robert Davie, founder of ITParade.com. The overall market is expected to reach $7.5 billion in the U.S. this year, according to Bruce Caswell, vice president of marketing at World Data Products.

USED EQUIPMENT MARKET

Prices in the secondary market can range from 20% to 30% of manufacturers' suggested prices for new equipment:

QuickLink 34975
www.computerworld.com



IBM

IT'S STORAGE. IT'S FLEXIBLE. IT'S YOU.

Yes, you. Whatever is vital to you – x-rays, blueprints, customer information – storing vast amounts of data is important. Even more important is access to that information. Having data right at your fingertips. Welcome to the on demand world enabled by IBM TotalStorage® systems. Where your servers and storage work together to better manage data across your organization, giving you a broad range of storage options. Thus, a total recognition of TCO, scalability and flexibility. IBM TotalStorage is for you. Find and learn the whole story at **ibm.com**/totalstorage/total

IBM TotalStorage®

IBM and TotalStorage are trademarks or registered trademarks of International Business Machines Corporation in the United States and/or other countries. Other company, product and service names may be trademarks or service marks of others. ©2004 IBM Corporation. All rights reserved.

Grid Storage

DEFINITION

Grid storage, analogous to grid computing, is a new model for deploying and managing storage distributed across multiple systems and networks, making efficient use of available storage capacity without requiring a large, centralized switching system.

BY RUSSELL KAY

QUICK STUDY

WE ROUTINELY talk about the electrical power grid or the telephone grid, and it's pretty clear what we mean — a large, decentralized network with massive interconnectivity and coordinated management. A grid is, in fact, a meshed network in which no single centralized switch or hub controls routing. Grids offer almost unlimited scalability in size and performance because they aren't constrained by the need for ever-larger central switches. Grid networks thus reduce component costs and produce a reliable and resilient structure.

Applying the grid concept to a computer network lets us harness available but unused resources by dynamically allocating and deallocating capacity, bandwidth and processing among numerous distributed computers. A computing grid can span locations, organizations, machine architectures and software boundaries, offering power, collaboration and information access to connected users. Universities and research facilities are using grids to build what amounts to supercomputer capability from PCs, Macintoshes and Linux boxes.

After grid computing came into being, it was only a matter of time before a similar model would emerge for making use of distributed data storage.

Most storage networks are built in star configurations, where all servers and storage devices are connected to a single central switch. In contrast, grid topology is built with a network of interconnected smaller switches that can scale as bandwidth increases and continue to deliver improved reliability and higher performance and connectivity (see diagrams).

What Is Grid Storage?

Based on current and proposed products, it appears that a grid storage system should include the following:

Modular storage arrays: These systems are connected across a storage network using serial ATA disks. The systems can be block-oriented storage arrays or network-attached storage gateways and servers.

Common virtualization layer: Storage must be organized as a single logical pool of resources available to users.

Data redundancy and availability: Multiple copies of data should exist across nodes in the grid, creating redundant data access and availability in case of a component failure.

Common management: A single level of management across all nodes should cover the areas of data security, mobility and migration, capacity on demand, and provisioning.

Simplified platform/management architecture: Because common management is so important, the tasks involved in administration should be organized in modular fashion, allowing the autodiscovery of new nodes in the grid and automating volume and file management.

Three Basic Benefits

Applying grid topology to a storage network provides several benefits, including the following:

Reliability. A well-designed grid network is extremely resilient. Rather than providing just two paths between any two nodes, the grid offers multiple paths between each storage node. This makes it easy to service and replace components in case of failure, with minimal impact on system availability or downtime.

Performance. The same factors that lead to reliability also can improve performance. Not requiring a centralized switch with many ports eliminates a potential performance bottleneck, and applying load-balancing techniques to the multiple paths available offers consistent performance for the entire network.

Scalability. It's easy to expand a grid network using inexpensive switches with low port counts to accommodate additional servers for increased performance, bandwidth and capacity. In essence, grid storage is a way to scale out rather than up, using relatively inexpensive storage building blocks. For more on scaling up vs. scaling out, see QuickLink a5050. **49829**

Kay is a Computerworld *contributing writer. You can reach him at russkay@charter.net.*

HP LEADS THE WAY

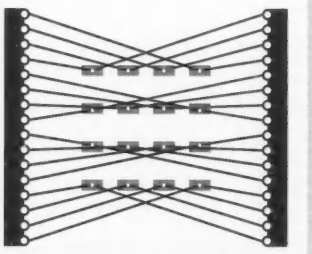
For more on the first grid storage product, from Hewlett-Packard, and the activities of other vendors, visit our Web site:

QuickLink 49972
www.computerworld.com

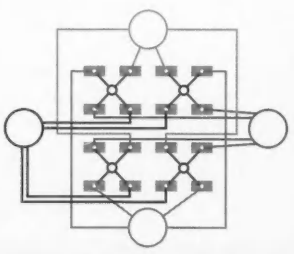
Are there technologies or issues you'd like to learn about in QuickStudy? Send your ideas to quickstudy@computerworld.com

To find a complete archive of our QuickStudies, go online to
computerworld.com/quickstudies

The Grid Storage Difference



Conventional 16-node storage configuration



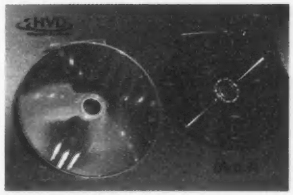
16-node grid storage configuration

Let's consider a simple network of 16 storage nodes in a high-availability environment, where all nodes require access to one another. The usual way to design this would be with two 16-port switches (the second one for fail-over) in a star configuration. Thus each switch is connected to each of the 16 nodes and each node is connected to both switches, and we have 32 wired connections and two expensive switches. There are two possible paths between any two nodes. If we want to expand the network, we can add more nodes only by also replacing the switches with ones that have more ports available.

In a grid arrangement, we could arrange the nodes in four groups of four, each connected to a simple four-port switch. We would also use four additional four-port switches, each connecting to one node in each of the four groups. Now we have 32 wired connections (the same as before), but eight four-port switches instead of two 16-port units, and each node is connected to two switches. In the event of a failure of any of the switches, there are many possible alternate paths to connect any two nodes. The arrangement is more resilient and less susceptible to catastrophic failure than conventional configurations. To expand the network, we can add more nodes and more small switches without having to re-engineer the whole structure. (Note: We could have achieved a similar result by configuring this with four eight-port switches.)

The Almanac

An eclectic collection of research and resources.



From the Labs: The Holographic Disc

■ **OPTWARE CORP.** in Japan (*www.optware.co.jp/english*) has come out with a prototype of what it calls the world's first holographic recording disc for reliable recording and playback of digital movies. The disc (above, left) is 12 cm in diameter — the same as DVDs and CDs — and could be on the market for commercial use in the first quarter of 2006 with a capacity of 200GB. That's the good news. The bad news is that the recorders are expected to cost about $20,000, and the discs will be $100 each. A less-expensive version for home use could be on the market as soon as 2007, the company says.

That could be good for consumers but bad for electronics companies, which will be trying to persuade buyers at about the same time to invest in blue-laser storage discs like Blu-ray Disc or HD-DVD, which have about one-fifth the capacity.

Future development of the Holographic Versatile Disc technology could boost its capacity to 1TB of data, Optware says. — *Martyn Williams and Paul Kallender, IDG News Service*

Storage Capacity: The Tipping Point

■ **How does your organization compare with these benchmarks?** An IDC study of 471 North American organizations found that, on average, 48% of their total storage capacity is currently utilized, and the trigger point for deciding to add more storage is 74%. This means that, on average, their storage systems are nearly "three quarters full" when they add storage capacity. The insurance and transportation industries push the threshold further than other vertical markets, saying their trigger point for adding storage is when it exceeds 81% utilization.

The insurance industry appears ripe for additional storage capacity, IDC says, because a quarter of the insurance companies reported that at least 80% of their capacity is currently used.

Events

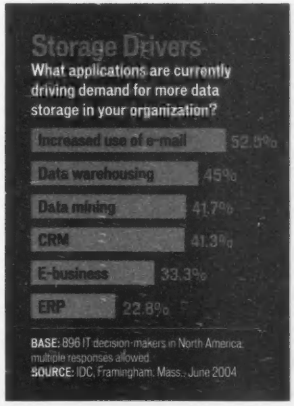
■ **Storage Networking World, Fall 2004**
www.snwusa.com
Oct. 25-28; Orlando

■ **High Performance Computing, Networking and Storage Conference**
www.sc-conference.org/sc2004
Nov. 6-12; Pittsburgh

■ **Network Storage Conference 2005**
www.networkstorageconference.com
March 7-9, 2005; Milpitas, Calif.

Hidden Costs of E-mail Archiving

■ Regulatory requirements are helping the e-mail archiving technology market to double this year, according to The Yankee Group in Boston. But large corporations will need to factor in increased storage, systems, networking, software and management costs, a bulletin from the research firm says. For example, "an enterprise with 5,000 employees will require nearly 4TB of storage every year" for e-mail archiving, the report says. "This will require storage management software and at least one full-time storage administrator." And if the company is using Fibre Channel storage systems, it may need to add networking equipment to the list, The Yankee Group says. **49812**



IT'S COMPACT.
IT'S AFFORDABLE.
IT'S YOU.

It's the enterprise-class IBM TotalStorage® DS6800 system. It's as low as half the price[1] and takes up as little as 5% of the space[2] of that "other" enterprise storage offering (the EMC Symmetrix DMX800). With Power Architecture™ technology and a surprisingly small footprint, it's designed to deliver lower costs. Is it storage or is it a strategy? It's both. It's IBM TotalStorage at its best.

Want to see for yourself? In person?

Learn more at the IBM TotalStorage Roadshow. With product presentations and the latest storage news. Don't miss out. See for yourself how you could benefit when everything works together. For more information or to register, go to **ibm.com**/totalstorage/save

IBM TotalStorage®

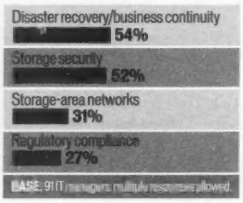
IBM.

[1]Price comparison based on U.S. list prices. Actual customer prices may vary. Compares IBM TotalStorage DS6800 system with 2TBs Operating Environment License software, 1.16TB using 146GB 10K FC Drives, 4GB of memory, 16 inch rack and FICON Attachment license (zSeries support), and EMC Symmetrix DMX800 with 2TBs Control Center Management software, 1.16TB using 146GB 10K FC Drives, and 4GB of memory. List prices for EMC Symmetrix obtained from Ideas International, www.IdeasInternational.com, as of 10/1/04. [2]IBM TotalStorage DS6800 may be used as a stand-alone unit, or mounted into a rack. Size comparison is based on stand-alone use. IBM, TotalStorage and Power Architecture are trademarks or registered trademarks of International Business Machines Corporation in the United States and/or other countries. Other company, product and service names may be trademarks or service marks of others. ©2004 IBM Corporation. All rights reserved.

SNAPSHOTS

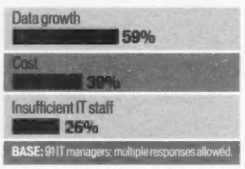
Top of Mind

IT managers say the following storage topics will be "extremely important" over the next three months:



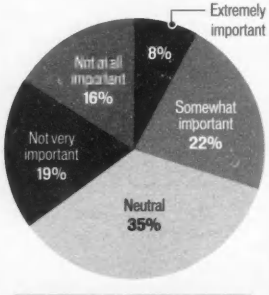
Storage Problems

IT managers say these are the top three storage headaches:



Yawning Over IP

IT managers don't seem very excited about IP storage, with many of them rating it as neutral or unimportant for the next six months.



SOURCE: *Computerworld*'s IT Leader Research Panel, August 2004

MARK HALL

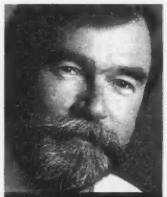
Long Live Tape

I'VE BEEN HANGING AROUND THE RUMOR-MONGERING, low-cost disk drive crowd lately, so I started to think that their ATA drives are making tape obsolete. And when the information life-cycle management forces added their whispers about the improved performance and low cost of archiving data to fixed disks, I became a fervent convert to the notion that tape is all but dead.

In fact, I had intended to write something like my "Farewell Floppy" column of nearly five years ago, in which I (correctly) dismissed the floppy disk as credible IT technology. I had the similar self-righteous vigor of a convert as I set forth to write my "Death to Tape" column.

Alas, I did my research before writing. (A generally wise, although not always accomplished, task among journalists.) Tape is far from dead. If anything, thanks to continued technology improvements and recent corporate management shenanigans and the legislative responses to them, tape for backup and archival storage is experiencing a resurgence.

Take IBM's recent tape business. It has seen four consecutive quarters of double-digit upticks in revenue. And its main competitor for tape systems, Storage Technology Corp., has announced 16 consecutive quarters of year-over-year earnings growth. Those aren't the numbers of a technology in a tailspin, nor are they what I expected to find.



MARK HALL is a *Computerworld* editor at large. Contact him at mark_hall@computerworld.com.

While technology advances and lower costs help keep tape competitive against ATA drives despite drawbacks in performance, it's the work of politicians that is giving tape renewed purpose in life. After all, they've passed Sarbanes-Oxley, the Health Insurance Portability and Accountability Act and other audit-friendly legislation, seemingly with tape in mind.

"A couple of years ago, legislation on corporate governance changed things," says Barry Rudolph, IBM's vice president for tape storage systems. Changed indeed — in a good way for tape storage makers.

That's because top management wants IT archivists to err on the side of saving too much information rather than too little and to spend as little as possible in the process. For today (and tomorrow), that means tape. A 200GB ATA drive sounds cheap at $140, but a $40 tape holds just as much uncompressed data. By the end of the year, IBM will be shipping a 400GB version.

Over at Fuji Photo Film USA in Valhalla, N.Y., Rich Gadomski tells me that his company has already demonstrated 1TB uncompressed capacity on a single tape cartridge and expects to have it on the market in a year or two. And both Fuji and IBM claim that single tapes with 10TB to 15TB of storage will ship by 2010.

Plus, tape archiving systems use 100% of a tape's capacity, while disk-to-disk approaches risk duplicating the same inefficient storage utilization rates on backup disks as on production ones.

With those kinds of capacity and efficiency numbers, it's clear that low-end drive makers will forever play catch-up to tape when it comes to the storage capacity/cost ratio. Plus, you don't have to add the incremental expenses of a full RAID storage system, cooling technology and electricity that you need to make a disk drive useful. Tape is happy just to sit idle, drawing no power, requiring no special HVAC support.

ATA disk drive makers brag that their low-cost technology has at least 100 times the performance that you'll experience retrieving data from tape system. However, in the world of compliance-driven storage, audits aren't done in real time. You can usually retrieve requested information in a few hours — or days — and still meet user needs. That's right up tape's alley.

Tape has an obvious portability advantage over disk. And it offers less-obvious protection against disk-based viruses because you can always revert data on tape to a state prior to an infection. But an infected disk affects the whole drive, regardless of what state the data might be in.

So, it looks like you'll be using tape systems for the foreseeable future. Instead of seeking ways to dump tape, you need to develop tape strategies with the same zeal you have for plans to migrate and upgrade operating systems and applications.

Tape media might reliably retain data for 30, even 50 years. But you shouldn't count on it, especially because the tape subsystems that read and transfer the data change at a much faster rate.

Although applications vary, most companies should overhaul their tape systems every 10 to 15 years. Check to make certain that the new devices efficiently work with old tapes. Also, every 15 to 20 years, bring all your archived data onto newer tape, choosing data formats that abide by industry standards to better ensure future compatibility.

Born in an IBM lab back in 1952, tape, it seems, will never die. **49686**

Being vigilant helps avoid surprises, in SANs as in life.

There are probably things happening right now on your SAN that could lead to appalling performance or a complete system crash.

You don't know when it will happen.
You don't know how it will happen.
But when it does happen, you'll wish you were aware things were building up to give you a nasty surprise, an expensive surprise.

Research shows that SAN downtime can cost organizations $100,000 per minute, or more.* Finisar's NetWisdom and Xgig solutions help you avoid these costs by monitoring your SAN to stop degradation, CRC errors and events that impact your most critical applications, business data and transactions.

View our web seminar, including a customer case study and demo of NetWisdom by visiting www.finisar.com/plan

Avoid nasty surprises. Monitor your SAN and hang on to your budget.

* Source: Fabric Computing: Beyond the N-tier Data Center, RBC Capital Reports Oct 2003

Finisar

Finisar has been speeding up networks and delivering best-of-breed products and testing solutions since 1988. NASDAQ: FNSR.

www.finisar.com/plan

Magazine Of the Year.

COMPUTERWORLD HAS BEEN NAMED MAGAZINE OF THE YEAR FOR 2004.

Every year the prestigious American Society of Business Publication Editors (ASBPE) selects one publication with 80,000 or more subscribers to receive this top honor. The award can go to any business publication in any industry category, and we won! We are proud that our ongoing commitment to editorial integrity, audience focus and in-depth coverage has been recognized by this auspicious award.

COMPUTERWORLD

THE VOICE OF IT MANAGEMENT)))

Bally Gaming + Systems is seeking a Director of Research & Development for the MindPlay product group in its Las Vegas, NV office. The Director will manage and develop all aspects of software development for Bally's advanced table games management technology group. This group utilizes an artificial intelligence hardware/software system that utilizes an embedded, high-speed image processing and computer vision components. Bally requires qualified applicants to be "hands-on" managers who will help define the overall architectures, specific interfaces and functionalities of Bally's system. This includes both leading and assisting electrical, mechanical and software engineers in developing advanced mathematical algorithms and software specifications and language for the optical hardware and computer vision software used in Bally's system. The applicant must be able to participate in the development of the system software. Qualified applicants must have a U.S. Bachelor's Degree or equivalent in Computer Science, Engineering or a related field, plus seven years' of progressively more responsible experience in in-depth object recognition, computer vision, algorithm development and imaging hardware design for dynamic environments. Gaming experience required. For consideration, please send your resume to:

Bally Gaming + Systems
ATTN: Director of
Technology Recruiting
6601 S. Bermuda Road
Las Vegas, NV 89119-3606

Information Systems Manager - Reqs: BS degree in Info Systems or related field, 2-yrs exp in related occupation. Exp. to include Network & Database Admin, ERP Admin, Computer Programming (Client/Server & Web), IS Supervision in discrete mfg environmt. Proficiency & exp. w/ the following or similar s/w: Win2k Svr, Linux/Unix, SLMail/Exchange, BackupExec, Symantec AV, ASP, HTML, iHTML, Frontpage, VFP, Access. Thorough knowledge & exp. in ERP modules incl: Distribution, Mfg, Fin., & integration of ERP modules w/ 3rd party s/w. Duties: Dev. IT strategies to support cn. goals; recommend req. h/w & s/w upgrades; work w/ dept. mgrs. to implement I.S. apps; Coord. w/ vendors for acquisition of products & services; Implement max. network & Internet availability; Ensure max.network & data security; Maintain user network accts; Assign user permissions to network resources; Setup & maintain network printers & servers; Troubleshoot, repair, & deploy apps on client PC's; Admin. mail server, network anti-virus, & RDBMS; Perform systems analysis & design; Develop VFP apps; Provide technical & functional support for existing ERP s/w; Dev. new ERP prog. which supports cn. Lean Mfg; Dev. web apps & assist in improving existing co. website; Integrate existing apps w/ web apps & create programs to synchronize web data w/ in-house data; other duties as assigned. Send resume to: HRD, Bullfrog Intl, 668 W 14600 S, Bluffdale, UT 84065.

AS/400 LEAD OPERATOR: AS/400 Specialist responsible for daily system operations, software releases, implementation, security; admin & developing documentation. Train operators. Req Business Recovery and management skills. Job located in Miami, FL. Supervise 6 employees; Bachelor Degree in Computer Sciences or equiv educ & exp; 2 yrs exp. in the job offered or 2 yrs exp. as a AS/400 System Operator; $44,080 per yr; 9:00am-5:30pm; 40 hr wk. Send resume to Agency for Workforce Innovation, Re: JOFL-2565132, P.O. Box 10869, Tallahassee, FL 32302.

IT PROFESSIONALS

Manager

(Glen Mills, Pennsylvania and other locations through the U.S.). Coordinate, design and implement technology enabled business solutions involving integration of ERP/CRM applications such as Oracle and Siebel through Tibco. Function as an integrator between business needs and technology solutions, leading the architecture of the technical solutions by creating process flows, designing documents, and developing and implementing test scenarios. Diagnose client/technical issues, manage projected time-lines to effectively deliver interfaces according to deadline. Lead team of consultants and provide them with direction and advice on design of documents, building interfaces, testing and deployment. Serve as a mentor to the team members in technologies such as Oracle ERP, Siebel CRM, Tibco Adapters, Oracle PL/SQL, SQL, Java, C++, and Integration Managers. Manage day-to-day client relationships at peer client level. Engage in overall project analysis by assessing projected timetables, project expectations and available financial and human capital resources. Participate in proposal development and sales presentations involving Enterprise Application Integration (EAI) using Tibco, and Enterprise Resource Planning (ERP) applications such as Oracle ERP.

The wage offered is $102,000 per year. The work schedule is Monday-Friday, 9:00 am to 5:00 pm. The minimum requirements are as follows: Bachelor's degree or equivalent in Mechanical Engineering or Engineering + 5 years of experience in the job offered or 5 years of experience as a Manager, Senior Consultant, Consultant or Associate Consultant. Employer will regard a foreign degree to be equivalent to a U.S. Bachelor's degree as determined by an accredited credentials evaluation service. Related experience must include at least three years of Java, SQL and C++ programming languages and at least one year of EAI Solutions Middleware, Tibco middleware, Oracle ERP, Oracle PL/SQL and Siebel CRM.

Please send your resume or CV, referencing Job Order Number WEB460739 to the: PA Careerlink, 701 Crosby Street, Suite B, Chester, PA 19013-6096. EOE.

Oracle Applications Database Administrator. Provide production support DBA services for Global Oracle Applics, v.11.0.3 running on SUN Solaris, incl all ERP & CRM modules; provide production support for Oracle 9i D/base support for Red Hat N/work & Red Hat.com running on Red Hat Linux 7.2; provide DBA services for Oracle 11i upgrade, incl migrating 11.0.3 to 11i & switching from SUN Solaris to Linux, & upgrading Oracle's RDBMS (Relational Database Management System) from 8.1.7 to 9i & 9i applics software; migrate & support Oracle Applic Servers on Apache Web Server; upgrade & patch current Oracle Applics using Oracle's std tool set; monitor & tune Oracle Applics SQL to improve performance in production & dvlpmt envrmts; monitor & adjust growth of Oracle d/bases; provide DBA support for Oracle Applics Dvlpmt group & Red Hat N/work engrs; dvlp, implmt & support reporting envrmt that enables Red Hat employees to perform data mining on Red Hat data. Req: Bach (or equiv) in Comp Engg or Comp Sci; 3 yrs in job offd or 3 yrs as S/ware Engr/Oracle Applics DBA; I) Min. 3 yrs of 1) Oracle Applics DBA exp on SUN Solaris or Sequent Dynix systms, incl installation & implmtn of ERP & CRM modules, d/bases & servers; 2) Oracle Applics Patching; 3) Exp creating & tuning SQL & PL/SQL scripts; 4) Exp in d/base backup & recovery procedures, d/base creation, & DBA maintenance tasks w/Oracle Applics; 5) Exp w/Oracle Applics advanced performance & applics tuning & Unix shell scripting; II) Min. 2 yrs of exp performing upgrades & migrations of Oracle Applics systms from 9.4.2 to 11i & Oracle Applics d/base upgrades from 7.x to current release; III) At least 1 yr practical exp w/HTML & JSP. Also reqd: Willingness & ability to provide 24/7 on-call support, telephonically & in-person, in-house & at client sites, on alternate wks. Hrs: 40+; Salary: $ 85K/yr. Interested applicants apply at nearest Employment Security Commission office or send resume to Employment Security Commission, 3351 Carl Sandburg Ct, Raleigh, NC 27610. All resumes & applications must incl SS# & refer to JO# NC7251711 & DOT code 039.162-010.

SYSTEMS ENGINEER (Tampa, FL) - Resolve systems design & implementation problems for international clientele in accordance with company standards & practices. Initiate & provide conceptual solutions to satisfy new &/or changing business rqments. Provide technical evaluations of hardware, software & tools & procedures utilizing COBOL, Easytrieve, JCL & DB2. Determine the impact on proposed changes on system architecture & provide technical solutions to meet documented requirements within schedule. Identify, recommend & document effective design methodologies & tools to be utilized during the design, coding, testing, implementation & installation phases. Monitor system performance to identify areas that need improvement. Position requires a Bachelor's Degree in Bus. Admin or Comp. Info. System, oral & written fluency in Spanish & Portuguese & 2 yrs of exp in the job offered or as a Engineer, Programmer or Analyst. 2 yrs of exp must include exp with data processing using COBOL, Easytrieve, JCL & DB2. M-F, 9-5, 40 hrs/wk. $71,500/yr. Submit resume to Agency for Workforce Innovation, PO Box 10869, Tallahassee, FL 32302-0869, Job Order FL-2563128.

Senior Programmer Analyst - At Quest Diagnostics, Inc, we've become the nation's most respected name in diagnostic testing by focusing on integrity, innovation and quality. We've created an environment where dedicated professionals can learn, grow and advance - all in an atmosphere of pride. We're currently seeking a Senior Programmer Analyst to be based in Lyndhurst, NJ. Candidate will perform overall design & architecture for IDAA computer system for order entry & processing of clinical lab tests. Code, design, test, document & maintain IDAA (Oracle/UNIX). Utilize iLog rules and CHARVA to program JAVA nClasses for user interfaces. Reqt's: Bachelor's degree in Comp. Sci., Electronics, or related field, and 5 yrs exp. in Software Development. Exp. must include 5 yrs exp with JAVA, UNIX, Oracle and n-tier architecture of business info processing systems, and exp with CHARVA and iLog Rules. EOE/M/F/D/V. Please submit source code: 41625 and forward your resume to Email: Charlene.R.Troncelliti@questdiagnostics.com or Fax: 610-650-2056.

The World Of Work Is Changing Every Week.

LUCKILY, WE ARE TOO!

itcareers.com is now powered by CareerJournal.com!

Search for jobs and post your resume here on www.itcareers.com

or call:(800) 762-2977

System Analyst. Two positions open. Oversee computer system reqs at company that compiles int'l trade data into proprietary s/w-based systems to conduct data analyses. Monitor WAN/LAN for bandwidth usage, traffic pattern, & security loop-hole. Perform security patch, s/w upgrade, backup, & user support. Maintain CISCO Routers, Switches, PIX Firewall, Fiber optical module, Gigabit network setup, & PowerVault/SAN storage solution. Be avail. after-hours in emergency. Configure Firewall, DNS, & VPN; set up iMail & Anti-Spam s/w, Norton Virus Scan, Windows Active Directory, PDC, BDC, & security. Assist in dev. Store Procedure & Triggers. Maintain multiple high avail. and perf. databases (consisting of int'l trade data w/diff. currencies & trade terminology). Implement Microsoft SQL Security, linked server, log shipping, reporting services, & server farm configuration. Assist in s/w testing & client support. Prereqs: Bach. in computer sci., computer eng, or related field, PLUS 2 yrs in job offered OR 2 yrs' in computer system administration or database design. Post grad. ed. in computer sci. or computer eng. may substitute up to 2 yrs' prereq exp. Competitive Salary. Job Location: Columbia, SC. Respond to: Global Trade Information Services Inc.; ATTN: R. Locklear; DCL-JK-1, 2218 Devine St; Columbia, SC 29205.

Software Engineer sought by D-T-H satellite television company in Littleton, CO to work in Englewood,CO & other unanticipated job sites in the U.S.At a senior level engage in full life-cycle software development of manufacturing & financial software applications in a client/server environment.The applications incorporate the ORACLE relational database management system & operate using UNIX, Windows or DOS operating systems. Analyze requirements; create designs; code, test, debug, modify & implement the software applications. Create documentation & provide customer support as needed.Maintain existing applications & systems, including upgrading applications. Utilize PL/SQL, ShellScript & Developer 2000 in designing & developing the software applications. Requires a bachelor's degree or foreign equivalent in computer science or related field. 2 years experience completing full life-cycle software development of applications in a client/server environment which incorporates the ORACLE relational database management system & using PL/SQL, ShellScript & Developer 2000-type tools. 8AM-5PM, M-F, $75,000/year. Respond by resume to: Employment Programs, PO Box 46547, Denver, CO 80202 & refer to job order No. COS094561.

Computer Professionals (Multiple Openings)

Software Engineer/Systems Analyst/Database Administrator/Network Administrator. Milwaukee, WI. Must have bachelors degree or equivalent and experience in some of the following skills: C/C++, Java, Web Methods, Cold Fusion, Microsoft Technologies (Visual Basic, .NET, ASP) CRM (Siebel, Clarify, Vantive), Middle Ware Technologies (Orbix, Corba, Tibco, Vitria) Data Ware Housing Tools (Informatica, Data Stage, Abinitio, Business Objects, Cognos, Micro Strategy, Brio) ERP (SAP, People Soft, Oracle Apps, Baan), Mainframe (Cobol, CICS, JCL, VSAM) AS-400, Ecommerce, Databases (SQL Server/Oracle/DB2/Sybase), Microsoft Windows (95/98/NT/2000,Exchange), UNIX (Sun Solaris, HP, AIX), Linux and QA (Win Runner, Load Runner, Silk, Quickpro, Manual Testing). **Position requirement: Must be willing to travel and /or relocate per project specification.** Mail your resumes to: jobs@iksolutionsinc.com.

or

Human Resource Director
IK Solutions Inc.
1840 N. Farwell Ave, Suite # 306
Milwaukee, WI 53202

SAP Consultant needed w/2 yrs exp in computer programs using MM, SD, F1, CO, CRM, BW modules in SAP R/3 w/Oracle on Unix & Windows as the presentation server employing Rapid Application Development (RAD) & Object Oriented Methodologies. Mail resumes to: Technisoft Inc. 1279 Colts Lane, Yardley, PA19067.

Senior Client Server Developer/Analyst. Code business logic, GUI interfaces and database interfaces using database specific languages. Design and develop GUIs and middleware (e.g. develop screen application templates; design windows, dialogues, menus and toolbars for complex processes and workflows). Develop and coordinate the testing process from small application releases or complex software enhancements. Research and recommend products and new technologies for the client/server environment. Req. a Bach. Deg. Or equiv. in Comp. Sci., Eng., Math or a related field, and 2 yrs of exp. in the job offered, Software Applications, Develop. and/or software eng. Qualified candidate must have at least 2 yrs exp. in interface screen design/develop. and/or client/server programming/ develop. Job located in Jacksonville, FL. $85,267/yr. 40 hrs/wk, M-F, 9am - 5pm. Send resumes to: Agency for Workforce Innovation, Ref: FL-2562153, P.O. Box 10869, Tallahassee, FL 32302.

Senior SAP Computer Systems Analyst (National Placement) Must be able to analyze systems supporting business processes, design solutions using SAP R/3 4.6C, perform configuration, testing, develop programs using ABAP to meet business requirements, develop interfaces using EDI, IDocs, BAPIs, perform system validations. Must have minimum 5 years of strong functional experience in customizing, implementing SAP R/3 Logistics - MM/WM, IM, LIV, Procurement, AP, AR, MRP, PP and Batch Management. Thorough understanding of SD, FI & experience in integrating SAP R/3 with i2 TMx suite of products is required. A yr Bachelor Degree in Management, Engineering, Computer Science, Mathematics, MIS, CIS or Foreign Equivalent required. $100,000/yr, 40 hrs/wk, 9a - 6p. Send resumes, listing Job Order # WEB461166 to Site Manager, Beaver County CareerLink, 2103 Ninth Avenue, Beaver Falls, PA 15010-3957.

BCCUSA, Inc - South Portland, ME needs experienced Programmer Analyst having a Bachelors Degree with minimum two years of progressive work experience in developing Sybase applications using Sybase/ASE 12.5/12/11.5, T-SQL, Actuate and MQ Series. Should have experience in performance tuning of Stored Procedures and SQL queries using Showplan & Statistics I/O. Should have experience in writing scripts using Unix Shell and PERL to automize day to day manual programs. Must have used utilities like BCP, DEFNCOPY, FTP. Prefer experience in Database backup and restore. Competitive salary and benefits. M-F, 40 hours/week. Please mail your resume to BCC USA Inc., HR Department, 650 Main Street Suite 201, South Portland, ME - 04106.

COMPUTER GRAPHIC ARTIST/ILLUSTRATOR

Design & create computer graphics; paint illustrations & hand sketches for web sites & marketing material; design logos & other digital imaging / print work. Create animated objects & characters using hand drawing & sketching for products & service presentation. Req. exp in fine arts, graphic design & 3D animation to support internal marketing & Web/Internet efforts. Exp in setting printer services; Job located in Fort Lauderdale; Bachelor in Graphic Design or equiv educ & exp; 2 yrs exp. in the job offered; $21.55 per hour; 9:00am-5:00pm; 40hr wk. Send resume to Agency for Workforce Innovation, Re: JOFL- 2565636, P.O. Box 10869, Tallahassee, FL 32302.

Software Engineer: For co. specializing in mktg & mnfg of computer software, design, code, implement & test complex product enhancements. This includes researching new feature's concepts & establishing plans & coordinating them; analyze problems & suggest innovative solutions; design & test plans; train & review design work of programmers. Reqs: Bachelors or equivalent w/ computer related coursework incl. operating systems, programming languages, computer application development. 3 yrs exp in job offered or 3 yrs of programming exp. Exp must incl. Software Configuration Mgmt, incl. developing & supporting version control, defect mgmt, change control, Release Engineering, Rational Clearcase version control, Multisite, VOB/View mgmt. Proficiency in PERL Scripting, BATCH Scripting, Triggers, Make, ClearMake, Omake, UNIX, Linux, Windows. 40hrs/wk. Send res. R-4, P.O. Box 17182, Phila., PA 19105.

Computer Network Engineer sought by computer networking design company in Greenwood Village, CO to work in Greenwood Village and other unanticipated job sites in the U.S. Under close supervision, performs moderately complex tasks in the design and installation of data communication servers and networks running TCP/IP on Windows NT/2000 or Unix platforms. Implements network servers and hardware utilizing Active Server Pages, QPSK telecommunication devices and hardware level programming for network chipsets. Requires bachelor's or foreign equivalent in electrical, electronics or computer engineering; 1 yr exp performing the core duties and utilizing the technologies described above. M-F; 8am-5pm; $45,000/yr. Respond by resume to Employment Programs, PO Box 46547, Denver, CO 80202 and respond to JON CO5092241

SOFTWARE CONSULTANT

Analyze & evaluate existing or proposed software systems. Dvlps, implements & improves progs., sys. & related procedures to process data using in-depth knowledge of software dvlpmnt life cycle. Encodes, tests, debugs & installs operating progs. & other sys. software utilizing ERP Package software (incl. MFG/PRO, SYMIX & Progress) as well as the Progress 4GL programming language. Bachelor's degree (or equiv.) in Comp. Sci., Math, Engnrg, Bus. or Commerce + 2 yrs exp. in position offered or as a Software Engnr, Prog. Analyst or Sys. Analyst reqd. Exp. must incl: (a) ERP Package software incl. MFG/PRO or SYMIX, (b) Progress Database & Progress 4GL, (c) Oracle/RDBMS, & (d) UNIX Systems. High mobility preferred. 40 hrs/wk, OT as reqd, 8 am - 5 pm, $66,730/yr. Submit resume to: Mon Valley Regional CareerLink, Donora Industrial Park, 570 Califfa Drive, Donora, PA 15033-1385. Refer to Job Order No. WEB 462523.

Programmer Analyst. Sought by Englewood Colorado consulting company to work in various unanticipated locations throughout the U.S. Duties: Analyze, plan, develop, test and document computer programs including business and database server applications. Evaluate user requests and software program requirements for new and modified programs. Write specifications, code, test and debug computer programs. Analyze and design databases within an application area. Use of SQL Server, PL/SQL, Visual Basic, ASP, XML, Crystal Reports, Oracle and Windows NT. Reqs. Bachelor or equivalent in Computer Science, Business Administration; Management Information Systems or related field. Plus 1 year in the job offered or 1 year in a related occupation, including Consultant, Application Developer. $55,744/year, 40/hrs /wk, 8:00AM-5:00PM. Respond by resume to WORKFORCE DEVELOPMENT PROGRAMS, PO Box 46547, Denver, CO 80202, and refer to Job Order No. CO5093663.

Programmer for sys. analysis, d/zn., & dev. of large enterprise applns. w/ d/base & internet tech. Use obj. oriented d/zn & structured sys. analysis & d/zn., s/w dev. & intgrn. on multiple CPU servers. S/W dev. w/ J2EE, Java, XML, DTDs, HTML, PHP4, C, Pro*C, Socket & Shell program. on UNIX. Sys. integrn. on Sun's 1280 servers w/ SAML, Weblogic, iPlanet web servers. D/base d/zn & prog. in Oracle us/ng SQL & PL/SQL. Intgrn. of Kenan's billing w/ ISP's op/n. supp. s/w. Intgrn of external a/c appg. s/w w/ online bnkg. s/w. BS in CS + 2 yr exp. in job duties. Comp. salary. Apply: Unilinx - Code RV, 4625 Alexander Dr., #110, Alpharetta, GA 30022 with proof of perm. W/k authzn.

Senior Java Web Developer, Wachovia Corp., Charlotte, NC. Responsible for Java dvlp. on authentication and hosting dvlp. team using standard dvlp. life cycle methodology on projects. Reqs. BA Info. Systems or Eng. & 3 yrs exp. in position offered or as a Software Developer, Programmer, or Software Eng. The 3 yrs exp. must incl. Java dvlp. using J2SE and J2EE on Windows and UNIX platforms, work with Oracle, SQL, C/C++, developing N-tier Java appl. for appl. servers (i.e. WebSphere, WebLogic, iPlanet) and SDLC methodolog and work with cryptography tools. M-F, 8-5, Send resume to Randall Buck, Wachovia Corp., 1525 West W. T. Harris Blvd. Bldg. 3A1, Charlotte, NC 28262. No phone calls.

Senior Programmer/Analyst Responsible for design, development, analysis, test, implementation and maintenance of GUI of FLICA (Flightline Internet Crew Access) for different airlines under client/server, web-based and wireless environments using C++, CGI Script, Delphi, DHTML, JavaScript, Transact SQL stored procedure, multiple-threaded application and object-oriented programming under windows 98/2000/XP/NT; Requirements: A self-starter who is able to work independently with minimum supervision; Bachelor Degree of Computer Science or a related field with five or more years of equivalent work experience. Working Hours: 40hours/week; Salary: $67500/year. Send resume to: Mr. Jeff Copelan at: Flightline Data Services, Inc., 404 Line Creek Drive, Suite 4, Peachtree City, GA 30269.

COMPUTERS - SENIOR SYSTEMS ADMINISTRATOR - Financial Management firm seeks Senior Systems Administrator to manage, maintain and upgrade Solaris/Unix-based network's central backup system, including STK L6000 library and STK 9940B tape drives. Duties include installation/maintenance of the batch system PBS and of Solaris/Linux systems; central LDAP service; internal company webservice; central CUPS-based printer service; user support and security. Master's degree in Computer Science or Computer Studies and 2 years exp. in job duties required. Will accept candidates with 2 years experience as Systems Administrator of high speed networks in UNIX environment. Mail resume to RTC, 600 Route 25A, East Setauket, NY 11733, Attn: JR.

ImageVision.Net, Inc. seeks Computer Programmer in our Middletown, PA loc. Analysis & design of software-based solutions using scripting languages in web environ. & latest dev. languages. Software testing & documentation. Understand & adhere to project plans. Use Oracle and System Development Lifecycle process & tools including NT based web technologies, IE 5.0 and Netscape 4.72 browsers, HTML, DHTML, VB Script, Java applet, CGI/BIN, ASP and XML. Must have Bachelor in Comp. Science, Bus. Information Systems, or related + 6 months relevant experience. Resume to Carolyn Smith, ImageVision.Net, Inc., Twelve Oaks Center, 1801 Oberlin Road, Middletown, PA 17057.

Intercall, Inc. has five openings for Software Engineers to lead teams to design, develop products for the telecom industry using VB, Power Builder, Developer 2000, Seagate Crystal, Java, XML, HTML, OOP, OOD, Oracle, Sybase, system architecture and programming on Unix, Windows NT platforms; analyze business processes to determine requirements which conform to overall strategic plan and provide operations support; train end users and team members. Require MS (or foreign equiv) in CS/Engineering (any branch)/related field & 1 yr exp in IT or BS (or foreign equiv) in one of the above fields with 3 yrs exp in IT. F/T. Competitive salary. Travel involved. Resumes to HR, Intercall, Inc., 1211 O.G. Skinner Drive, West Point, GA 31833. Please refer Job ICI0904.

Analyst/Project Programmer, Lead

The Medical College of Wisconsin is seeking an analyst/project programmer, lead for its Bioengineering and Biotechnology Centerto develop techniques for analysis of data from microarray and proteomics experiments. Candidates must possess a Master's degree in computer science, computing, bioinformatics or related and have knowledge of microarray data analysis using Singular Value Decomposition, Statistical Modeling of Microarray Data, and programming using MATLAB software. Three years of prior experience as a software engineer or computer programmer is also required. To apply send cover letter and resume to Medical College of Wisconsin, Employment Office-JMC1018, 8701 Watertown Plank Rd., Milwaukee, WI 53226, fax: 414-456-6502.

Software Engineer III. Develop, operate, maintain distributed software systems; lead team of programmers developing software projects; utilize MS SQL to program & manage database applications; perform software costing; use 3D programming to build web applications. Requirements: Masters in Comp. Sci. or related field PLUS 3 yrs. exp.* in job or as Software Engineer/Programmer incl. 2 yrs. using MS SQL & 3D programming. *In lieu of Masters & 3 yrs. exp., will accept Bach. in Comp. Sci or related field plus 5 yrs. exp. in job or as Software Engineer/Programmer incl. 2 yrs. using MS SQL & 3D programming. Send CV to Tietronix Software Inc., attn: HR, 1331 Gemini, #300, Houston, TX 77058, fax: 281-461-9350, email: info@tietronix.com.

Fixed Income Analytics Integration Developer, Wachovia Securities, Charlotte. Provide technological and analytical support to primary trading areas. Reqs. MA in Math or Eng. 2 yrs exp. in pos. offered or as a Software Developer, Information Technology Officer, or Mathematician. The 2 yrs exp. must incl. work developing and integrating analytics for capital markets trading. 1 yr. exp. must incl. work with Java, relational databases and object oriented design. M-F, 8-5. Send resume to Meredith Elberson, Wachovia Corp., 401 South Tryon Street, 15th Floor, Charlotte, NC 28288-0475. No phone calls.

IT Financial Analyst needed to provide account mgmt, sales & bus dvlpmt, resource staffing & outsourcing, product dvlpmt & mgmt of large, mission-critical IT projects; build & manage multi-million $ portfolios; conduct presentations. Resume to: Global Consultants, Attn: Hireme, 25 Airport Rd, Morristown, NJ 07960

Leading software development company seeks software engineers. Qualified applicants must have Masters degree or (US equiv) in Computer Science, Computer Information Systems or Computer Engineering, at least 2 years experience in position offered or as a Software Developer, Software Analyst, Systems Analyst or Technical Architect and experience with Java, J2EE, .NET, Clarify, ERP, Oracle, Rational Rose and Unix. Qualified applicants send resume and salary requirements to Princeton Information, Ltd., 13200 Metcalf Ave, Ste 260, Overland Park, KS 66213. Attn: JF.

Want a new IT career?

Check out our jobs in the combined CareerJournal.com database.

www.itcareers.com

CW101804E/MW/W 2

Computer Systems Analyst III, Wachovia Corp., Charlotte, NC. Administer Argo ECS 4.0 system and serve as Mid-tier Type Architecture. Reqs. BA in Info. Tech. and 2 yrs exp. in pos. offered or as a Network Tech. Consult. The 2 yrs must incl. exp. networking GUI for existing mainframe and data in a fin. institution (i.e. ARGO/Bankpro) and work designing & implementing a mid-tier architecture platform & troubleshooting network problems w/ Ethernet, IP and SNA protocals, switches, routers and probes.M-F, 8-5, Send resume to Jane Higgins, Wachovia Corp., 401 S. Tryon Street, 27th Floor, Charlotte, NC 28288-0475. No phone calls.

Purchaser wanted by a computer components company in Holbrook, NY to purchase computer chips and other components for resale. 3 yrs related exp. req'd and must be familiar with overseas supply sources. Resume only to CMB Components, Inc., 630 Broadway Avenue, Holbrook, NY 11741; Attn: Peter Castellama.

Programming Instructor Development special teaching programs for refreshment courses. Borland Interbase MUI Development, MS Access, VB, Delphi, PL/SQL, ODBC, Win2000/XP.B.S. in C.S. Provide User training,database troubleshooting, perfom buckup and recovery procedures. Resume A-soft Scientific, P.O. Box 1270, Roswell, GA 30077.

Programmer/Analyst

Leominster, MA – Plan, dev, test & doc comp sftwr for MRPII/ ERP using Win CE, wireless netwk, embedded visual studio, pocket PC, Borland C++, RPG, ASP, XML, HTML, COM, DCOM, VB, Java, PL/SQL w/MS SQL Server & DB2 db's. Bachelor's degree in Comp Sci. Min 2 yrs exp. Send resume to: **Director of IT, Alpha Wire Co., 711 Lidgerwood Ave, Elizabeth, NJ 07207**.

Programmer Analysts to design, develop, test, implement appls using Siebel tools, C, C++, Java, ASP, Oracle, JavaScript, VB-Script, HTML, JDK, JDBC, Visual Basic, etc using UNIX and Windows OS; develop, enhance components of new/existing appls and databases; perform reqs gathering, analysis, planning, testing, implementation & troubleshooting. Require: BS or foreign equiv in CS or Engg(any branch) with 2 yr exp in IT. High salary. F/T position. Travel involved. Resume to HR, Smartsoft International, Inc., 3965 Johns Creek Court, Ste 500, Suwanee, GA 30024.

Programmer Analyst (Multiple Positions) needed w/2 yrs exp to design, develop, deploy & manage applications, design backup & fault tolerant solutions using Designer, Visio, OEM, Rational Rose, PVCS, TOAD, SQL, PL/SQL, Shell programming with Oracle & SQL Server as RDBMS on Windows & Unix. Mail rsm to: Empower Technology Solutions Inc., 120 Quarry Dr., 2nd Flr, Milford, MA 01757.

enterprise integration

network vulnerabilities

corporate data security

government compliance

mobile & wireless security

business management needs

The right IT professional can jump the hurdles of today s IT challenges.

Call:

(800) 762-2977

Computers-Programmer /Analysts needed. Seeking qual. candidates possessing BS or equiv. and/or rel. work exp. Part of the req. relevant exp. must include 2 yrs. working with ClearPath IX/ 2200, SSG & DEPCON. Fwd. resume & ref. to: Vennsys, LLC, Attn: HR, 5440 Willow Rd., #117, Waunakee, WI 53597.

Web Developer needed w/Bachelors Degree or Foreign Equivalent & 2 yrs exp in web application using MTS, MSMQ, COM/ DCOM/COM+, C++, SQL Server, Crystal Reports, DB2 Mainframe, Visual StudioNET. ASP.NET, ADO.NET, C# & VB.NET. Domestic travel is req'd. Mail Resumes to: Open Systems Technologies, Inc. 8 Winter Street, 6th Floor, Boston, MA 02108.

Software Engineer w/bach or foreign equivalent in Comp. Sci or Engg. or Math + 1 yr exp in Java, Servlets, JSP, EJB, XML, JavaScript, ASP, Visual Basic, SQL Server database, create data warehouse and client server applic. using Oracle, PL/SQL as ETL & Business Objects as OLAP Reporting Tool. Mail res: eBusinesscorp Inc. 209 West Central Street, Suite 106, Natick, MA 01760.

Software Engineer needed w/MS in Comp. Sci. or Engg. or Math & 1 yr. exp in s/w applications using VB on Windows. Customizing Test Director using C++, Jasmine ii, Uni-Center TNG, HL7 & DICOM, WinRunner, SMS & mathematical modeling using MatLab, Maple & S-Plus. Exp prior to MS degree acceptable. Mail Resumes to: EBusinesscorp Inc, 209 West Central Street, Suite 106, Natick, MA 01760.

DBAs to install, configure, maintain Oracle Appls and Oracle Dev. software; evaluate, design existing/proposed Oracle db structures/systems; analyze database reqs of existing/new appls; monitor performance, tune, backup/recovery strategy planning, and troubleshoot problems; maintain security of databases. Require BS or foreign equiv. in CS or Engg (any branch) with 2 yrs exp in database admin. Comp. salary. Travel involved. F/T openings in Elgin, IL & Lower Gwynedd, PA. Resume to: HR, Fourth Technologies, Inc., 585 Tollgate Road, Suite 1, Elgin, IL 60123. Specify location desired, JobID DB964 on resume.

Clutchpoint delivers innovative IT solutions, has openings for experienced Prog/Systems Analysts, S/W Engineers with any of following skills: Oracle, Sybase, SQL, C/C++, Visual C++, OOD, Java, Web Tech, UNIX, NT, VB, ASP, HTML, SAP, Peoplesoft ERP. Send resumes to jobs@clutchpoint.com. EOE

Techgene Solutions has openings for Software Engineers or other IT staff. Candidates must have BS/MS with experience. Prefer skills in Cobol, JCL, Oracle, SQL, VB, C/C++. Travel may be required for some positions. Competitive salary. Please apply at bapujik@yahoo.com. No calls. EOE.

Software Engineers - Sybor Technologies Inc. seeks qualified Software Engineers. Bachelors degree required with experience in developing and implementing programs using SYBASE ECMAP and SYBASE Adaptive Server Enterprise. Reply by mail to: 3506 Highway 6 South, #249, Sugar Land, TX 77477.

Netrion Corp. seeks multiple Systems Analysts to dsgn, dvlp, customize, implmt, & support Peoplesoft applics for clients. Eval client's business process needs, dvlp specs & setup Peoplesoft HRMS applic modules. Conduct data conversion, testing, dsgn, documentation & perform related duties. Travel reqd. Associates deg in sci or engg related study is reqd w/2 yrs related exp. Send resume to Netrion Corp., 360 S Schmale Rd, Ste 202, Carol Stream, IL 60188.

Hetrosys, LLC, based in Detroit, MI seeks Applications Database Administrators and Sr. Programmer Analysts for Detroit and nationwide opportunities. Applications DBA requires bachelor's in computer science, 4 yrs exp. as DBA and working knowledge of Kintana and Tick Mark. Programmer Analyst positions require 3 yrs exp. customizing and extending Oracle e-Business suite of applications and working knowledge of Oracle Work Flow Development Tool. Apply via U.S. Mail with resume to Hetrosys, LLC, 3757 S. Baldwin Road, #223, Lake Orion, MI 48359.

Technical Software Consulting, Inc. seeks software engineers or system/programmer analysts or DBA to develop system applications for clients. Minimum requirement is BS/MS with IT experience. Competitive wage with full benefits, sponsor H-1/ green card. Send resumes to hr@tsc-inc.com. EOE.

Multiple openings for IT professionals by Z3 Technologies to design and customize applications. Travel may be required. Candidates must have BS/MS with exp. Following skills preferred: Oracle, Sybase, SQL, C/C++, Visual C++, OOD, Java, Web Tech. Please contact info@z3technologies.com. EOE

System Analyst. Perform computer system analysis & programming to meet client's business requirements; design & implement computer data networks including install & configure network equipment; work on Spectrum Element Manager Network Management System; use BPCS 6.2, AS/400, RPG/400, RPGLE & AS/SET, OS/400, Win NT 4.0, VAX/VMS 5.2 & variants of UNIX. Req: Bachelor or equivalent (accept 3-yr college+PG diploma as equiv), 6-month exp as Programmer/Analyst or IT Consultant. 40hrs/wk, 8-5pm, $48k/yr. Send resume to: Employment Security, 32 S. Main St., Concord, NH 03301-4857. Re: 2004-469. Employer paid ad.

Software Engineer (Applications) utilizing CAD/CAM in San Jose @ $81k/yr. Travel w/in US req. 40% of the time. Mail to Micronic Laser Systems, Inc, 1922 Zanker Rd., San Jose, CA 95112 or fax (408) 392-2261.

Seeking qualified applicants for the following positions in Memphis/Collierville, TN: Senior Programmer Analyst. Formulate/define functional requirements and documentation based on accepted user criteria. Requirements: Bachelor's degree* or equivalent in computer science, MIS, engineering or related field plus 5 years of experience in systems/applications development. Experience with COBOL, IMS and DB2 also required. *Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to Jay Boane, FedEx Corporate Services, 40 FedEx Parkway, 2nd Floor Horizontal, Collierville, TN 38017. EOE M/F/D/V.

Software Engineer sought by comp services Co specializing in Magic Software to dvlp, implmt, test, document & support customers. As Co. is supporting other Magic dvlprs, Enhanced Magic knowl is necessary. Must have Bach & 5 yrs exp w/Magic prgmg incl version 9.4. Must have exp w/HTML, Java Script, MS-SQL, Oracle, Web-services. Resume to Ronen Canetti, Owner, WizMagic, LLC 4024 Radford Ave., Bldg 2, Rm 201, Studio City, CA 91604.

Jr. Programmer Analyst. Dvlp, create, & modify computer app, s/w incl. Oracle databases & new versions of the Oracle RDBMS. Design security for all of the Oracle Databases. Coordinate database dvlpmt, create & design logical & physical models for the OLTP & OLAP appl. using tools incl. Erwin, Oracle Designer. Assist in designing the Datamarts & Datawarehouses using Kimballs & Inmons methodologies. Req: BS in Engineering plus 2 yrs. exp. Sal: Open. 40hrs/wk. Job/Interview Site: Des Moines, IA. Send resume to Chuck Gutte, Emprise Consulting LLC @ 200 E Sandpointe Ave, Suite 725, Santa Ana , CA 92707

Computer Programmer Wanted

To code, test, and document computer programs using JAVA, JSP, Java script, Python, SQL, FreeBSD, Solaris, Windows 2000 server on MS SQL Server 2000 and MySQL databases. Req. BS or foreign equiv. in CS, Engineering, or a related field and proficiency in Java, JSP, MySQL, FreeBSD, and Solaris. 40hrs/wk. Fax resume to HR, Experclick, Inc. at 805-456-0166. Ref. Code: CA-JL.

Systems Integrator II: Deliver complex Interactive Voice Response software applications for customers purchasing company network products. Assist account teams in understanding customer needs, assist w/solution design, document proposed solution in statement of work, develop acceptance criteria, project plan & time estimate. Interview customer's end users to gather detailed requirements, produce & gain customer acceptance of functional specifications document & design, develop, integrate, test, install & place solution in production at customer's location. Support customer throughout acceptance period as well as train them on solution administration. Provide knowledge transfer of solution architecture & administration & problem diagnosis & resolution. Work & support company management, product specialists, projects managers & fellow associates. M-F 40h/w. $79,600/yr. B.S. in CS or Engineering + 5 yrs exp in job offered or 5 yrs exp in Software Eng. Exp must include 2 yrs exp in Interactive Voice Response Systems, strong development & system administration skills in various Unix platforms. Must possess knowledge & understanding of call center technical environment, computer telephony interface technologies, Text-To-Speech, Speech Recognition, PBX & Adjuncts. Please forward resumes to: Agency for Workforce Innovation, P.O. Box 10869, Tallahassee, FL 32302. Pls. reference: JOFL#: 2565435

Millennium Software, Inc. has opportunities: Programmers, Systems Analysts, Software Engineers, Consultants, DBAs, Architects and Project Managers with 4 or more skills in following environments: Java, J2EE, COM/DCOM, EJB, Shell Scripts, SAS, PLC, Textra, XML, SQL, mq-PCX, PowerBuilder, Rational Rose, Relational Databases, Perl, SAP, Primavera Team Play / P3e, Teradata, MQ-Series, IMS, Adabase, Natural, Websphere, Oracle Workflow, Filenet eprocess, Floware Workflow engine, C/C++, HTML, Visual-Basic, COBOL, DCEDFS, Auto-CAD, Six-Sigma, ASP.net, Mercury Test Tools, SMS, TCP/IP, Veritas, Tivoli. B. S. or M.S. degree & 1-2 yrs exp reqd. depending on position We also accept the foreign edu. equiv. Or any suitable combination of edu, training or exp. Frequent travel and relocation. Send confidential resumé and salary requirements to: 2000 Town Center, Ste 300, Southfield, MI 48075. Visit our website at: www.webmsi.com.

PROGRAMMER/ANALYST to analyze, design, develop, test, enhance and maintain web-based and client/server application software for the insurance industry using Java, C/C++, Java Script, Oracle, JDBC, J2EE, JSP, Servlets, EJB, XML, Struts, UML, SSL, Tomcat Server and TCP/IP under Windows 98/2000/NT/XP, DOS and UNIX/Linux operating systems. Require: B.S. degree in Computer Science, an Engineering discipline, or a closely related field with 2 yrs of exp in the job offered; A M.S. with a demonstrated ability to perform the stated duties gained through academic coursework/previous work experience will be accepted in lieu of the B.S. and 2 yrs of exp. Competitive salary offered. Send resume to: Infinity Property & Casualty Corp., P.O. Box 444, Birmingham, AL 35209; Fax at 205-803-8406; or E-mail at Jobs@ipacc.com; Attn: Job ZD.

Infinite Computing Systems a Cedar Rapids, Iowa Company is seeking qualified computer professionals. Current positions available must meet the following requirements. All positions require at least a Bachelors degree (3 year fgn Bachelor degrees are acceptable). We may have additional positions available in addition to the ones listed. Multiple positions are likely available in some positions. Candidate's salary offered relative to experience and skills. Candidates must be willing to relocate and travel as needed.

A variety of positions are available, which require between 1-5 years of experience in the below-listed skills. Certain positions may require a Masters degree.

- Java, HTML, XML, Weblogic or Websphere
- Expeditor, Cobol, DB2, JCL, IDMS or IMS
- ERP (e.g. SAP, Peoplesoft or Oracle Apps)
- Visual Basic, SQL, ASP.net, SQL Server
- Easytreive, QMF, Cobol, CICS, SAS, TSO/ISPF
- C, C++, GUI, Oracle or Informix or Sybase

Please send resume and cover letter to: Raj Inani, President, Infinite Computing Systems, Inc., 230 2nd Street - Ste 214, Cedar Rapids, IA 52401.

SYSTEMS ENGINEER III - SYSTEMS ANALYSIS & PROGRAMMING - (Temple Terrace, FL) - Provide conceptual & technical solutions to complex business or technical problems. Develop & implement standards & verify results. Provide technical expertise in operating systems & applications systems in the telecommunications industry. Design & develop business process automation systems for the telecommunications industry on client-server architecture. Provide technical solutions to meet documented requirements within schedule. Identify, recommend & document effective design, coding, testing implementation & installation phases. Utilize Rational Apex tools, PL/SQL, Oracle, Kenan Arbor BP & Unix. Position requires a Bachelor's degree, or the equiv., in Computer Sci, Info. Tech, or Eng (any) & 5 yrs of exp. in the position offered or as an Engineer, Programmer or Analyst. The 5 yrs of progressive exp. must include some experience using Rational Apex tools, PL/SQL, Oracle, Kenan Arbor BP & Unix. As equivalent to a Bachelor's degree, the employer will accept a degree or combination of education, training & experience that has been determined by a credential service to be equivalent to a U.S. Bachelor's degree from an accredited U.S. institution of higher learning. 40hrs/wk, 9 -5, M-F, $71,400/yr. Submit resume to Workforce Program Support, PO Box 10869, Tallahassee, FL 32302-0869. Job Order FL-2562442.

PROGR ANALYSTS/DESIGN ENGINEERS: des, dev bus & engg RDBMS based & PLM/PDM applns such as Metaphase,Windchill, etc. BE or ME in CE, Mech, EE or rel w/1-5 yrs exp in skills such as Oracle, SQL.Pro*C, PL/SQL, C, C++, Java, VB, Unix, XML, UML tools, IDE, CAD/CAM. Multiple positions in Detroit & other sites. Mail res to HR, 33533 West 12 Mile Rd, #131,Farmington Hills, MI 48331.

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Visual Basic, Oracle, C and C++. Requirements: Bachelor's Degree, educational or functional (3 years experience=1 year of college) equivalent, in Engineering, Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Visual Basic, Oracle, C and C++. Salary: $70,242/year. Working conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Armstrong County CareerLink, Attn: CL Program Supervisor, 1270 North Water Street, PO Box 759, Kittanning, PA 16201, Job No. WEB462126.

INFORMATION TECHNOLOGY Member Technical Staff, Software. Req. Bachelor's degree (or equiv. foreign edu.) in Comp. Science or Eng. and 4 yrs. of experience in the job offered or 4 yrs. of experience in systems software engineering, including device driver development and crash dump analysis. 2 yrs. of stated experience must include performing Fibre Channel analysis, troubleshooting of storage solutions, and utilizing shell scripts, C, SCSI and SAN. Perform systems software engineering, including device driver development and crash dump analysis. Send resumes to: M. Thorpe, Job Reference #00222, Network Appliance, Inc.,375 Totten Pond Road, 3rd Floor, Waltham, MA 02451-2010.

Luceo, Inc. seeks Programmer based out of our Naperville, IL loc. Code, test, implement, maintain SAP R/3 + BW programs. Use Bus. Perf. Mgmt, Bus. Modeling, Metadata Mgmt, Data extraction, transformation, loading, Query Design, Reporting, Web App. Design, BW Perf Mgmt & BW Admin, SAP BW Integration, SAP BW data loads, SAP BW system landscape & object transport proc, SAP Bus. Explorer (BEx), SAP BW in Oracle environ. Some travel required. Must have Bachelor Engineering or related + 2 yrs relevant exp. Resume to Luceo, Inc., 1431 Kallien Avenue, Naperville, IL 60540.

PROGRAMMER ANALYSTS needed. Analysis, program & evaluate web based applications using Java, Java Development tools & Active Server Pages (ASP). Bachelors required in Math, Computers, Engineering or any other related field of study, plus two years of experience in the job duties described above. Various unanticipated work locations throughout U.S. Assignments generally 4-10 months duration. Salary $65,000.00/yr. for a 40 hour work week. Submit to PA Careerlink, 1260 New Rodgers Road, Bristol, PA 19007. Refer to Job Order #WEB-461364.

PROGRAMMER/ANALYST

Programmer/analyst needed with experience in software analysis, gather requirements, design, develop and test the software applications. Experience in COM, MTS, ODBC, SAP, ABAP, WML, Oracle, SQL server, J2EE, JSP, EJB, COMTI, ERP system integration and internet technologies is required. $55,000/year. Bachelor's degree or equivalent in engineering/computer science and two years of experience. Mail resumes to: Infoweb Systems, Inc, 3435 Asbury Road, Suite 175, Dubuque, IA 52002, #563-556-7990 (fax).

Computer Programmer. Job location: Cary, NC. Duties: Design & develop core modules for WebSphere Commerce-Telesales Framework utilizing ext. prog. & architectural exp. Develop performance metrics for accelerated throughput, runtime deployment software build & pkg. implementations using Core Java. Propose & implement adv. Object Oriented archs. for WebSphere Commerce-Telesales product using Java. Design & implement design patterns & deploy technique for code reuse using C++ & Java. Requires: B.S. (or foreign equiv.) in Comp. Sci., Eng. or a related field. Must be certified programmer in Java. Mail res-ume (no calls) to: Dawn Borden, CTG, Inc., 6501 Weston Pkwy., Ste. 175, Cary, NC 27513.

itcareers.com can solve the labyrinth of job hunting by matching the right IT skills with the right IT position. Find out more at: www.itcareers.com

www.itcareers.com

is the place where your fellow readers are getting a jump on even more of the world's best jobs.

Now combined with CareerJournal.com, you have more jobs to choose from.

Stop in for a visit and see for yourself at:

www.itcareers.com

CW101804N.4

COMPUTERWORLD HEADQUARTERS

One Speen Street, P.O. Box 9171
Framingham, MA 01701-9171
Phone: (508) 879-0700
Fax: (508) 875-4394

PUBLISHER/CEO
Bob Carrigan
(508) 820-8100

EXCUTIVE ASSISTANT TO THE CEO
Nelva Riley
(508) 820-8105

VICE PRESIDENT/ GENERAL MANAGER ONLINE
Martha Connors
(508) 620-7700

EXECUTIVE VICE PRESIDENT/ STRATEGIC PROGRAMS
Ronald L. Milton
(508) 820-8661

EXECUTIVE VICE PRESIDENT/COO
Matthew C. Smith
(508) 820-8102

VICE PRESIDENT/ NATIONAL ASSOCIATE PUBLISHER
Matthew J. Sweeney
(508) 271-7100

VICE PRESIDENT/ EDITOR IN CHIEF
Don Tennant
(508) 620-7714

VICE PRESIDENT/CIRCULATION
Debbie Winders
(508) 820-8193

CIRCULATION
Circulation Coordinator/Diana Turco, (508) 820-8167

PRODUCTION
Vice President Production/Carolyn Medeiros; Production Manager/Kim Pennett; **PRINT DISPLAY ADVERTISING:** (508) 820-8232, Fax: (508) 879-0446; **DISTRIBUTION:** Director of Distribution and Postal Affairs/Bob Wescott

MARKETING
Director of Marketing/Matt Duffy, (508) 820-8145

STRATEGIC PROGRAMS AND EVENTS
Vice President Strategic Initiatives/Leo Leger; Vice President Business Development/John Amato; Director, Event Sponsorship Sales/Ann Harris; Director, Event Marketing and Conference Programs/Derek Hulitzky; Group Manager, Event Operations/Michael Meleedy; Marketing Manager/Kate Carroll; Marketing Program Coordinator/Chris Leger; Operations Manager/Lynn Mason; Conference Manager/Nanette Jurgelewicz; Customer Service Specialist/Pam Malingowski, One Speen Street, Box 9171, Framingham, MA 01701-9171, (508) 879-0700, Fax: (508) 626-8524

ONLINE ADVERTISING
National Director of Online Sales/Operations, Gregg Pinsky, (508) 271-8013; Online Sales Manager/Sean Weglage, (415) 978-3314, Fax: (415) 543-8010; Online Account Executive/David Guarnieri, (415) 978-3309, Fax: (415) 543-8010 ;Online Sales Assistant/Kathy Snow (508) 270-7112; One Speen Street, Box 9171, Framingham, MA 01701-9171, Fax: (508) 270-3882

IT CAREERS ADVERTISING SALES OFFICES
Vice President, Recruitment Advertising/Nancy Percival, (800) 762-2977, Fax (508) 879-0184, Sales & Marketing Associate/Deborah J. Green, (508) 620-7757, Fax (508) 879-0184, One Speen Street, Framingham, MA 01701; **EAST:** Regional Manager/Jay Savell, (610) 758-9755, Fax (610) 419-2134; Account Executive/ Danielle Tetreault , (508) 620-7759; **CENTRAL:** Regional Manager/Laura Wilkinson, (847) 441-8877; Account Executive/Mark Dawson, (508) 620-7760; **WEST:** Regional Manager/Caroline Garcia (408) 941-0562; Account Executive/Mark Dawson, (508) 620-7760

LIST RENTAL
POSTAL: Rich Green, (508) 370-0832, e-mail: rgreen @idglist.com. **E-MAIL:** Christine Cahill, (508) 370-0808, e-mail: ccahill@idglist.com. **MAILING ADDRESS:** IDG List Services, P.O. Box 9151, Framingham, MA 01701-9151, Fax: (508) 370-0020

COMPUTERWORLD SALES OFFICES

VICE PRESIDENT/NATIONAL ASSOCIATE PUBLISHER
Matthew J. Sweeney
(508) 271-7100
Fax: (508) 270-3882

SALES BUSINESS MANAGER
Laureen Austermann
(508) 820-8522
Fax: (508) 270-3882

NORTHWESTERN STATES
ACCOUNT DIRECTOR: Jim Barrett (415) 978-3306; **ACCOUNT EXECUTIVE:** SaraJane Robinson-Retondo (415) 978-3304, 501 Second Street, Suite 114, San Francisco, CA 94107, Fax: (415) 543-8010

BAY AREA
ACCOUNT DIRECTOR: Jim Barrett (415) 978-3306, **ACCOUNT EXECUTIVES:** Emmie Hung (415) 978-3308, SaraJane Robinson-Retondo (415) 978-3304, 501 Second Street, Suite 114, San Francisco, CA 94107, Fax: (415) 543-8010

SOUTHWESTERN STATES
ACCOUNT DIRECTOR: Bill Hanck (949) 442-4006; **ACCOUNT EXECUTIVE:** Jean Dellarobba (949) 442-4053, 19200 Von Karman Avenue, Suite 360, Irvine, CA 92612, Fax: (949) 476-8724

EASTERN CENTRAL STATES/ INDIANA
ACCOUNT DIRECTOR: Peter Mayer (201) 634-2324; **ACCOUNT EXECUTIVE:** John Radzniak (201) 634-2323, 650 From Road - 2nd Floor, Paramus, NJ 07652, Fax: (201) 634-9289

CENTRAL STATES
ACCOUNT DIRECTOR: Bill Hanck (949) 442-4006; **ACCOUNT EXECUTIVE:** Jean Dellarobba (949) 442-4053, 19200 Von Karman Avenue, Suite 360, Irvine, CA 92612, Fax: (949) 476-8724

NEW ENGLAND STATES/ MINNESOTA/ WISCONSIN/ OHIO
ACCOUNT DIRECTOR: Laurie Marinone (508) 271-7108; **ACCOUNT EXECUTIVE:** Deborah Crimmings (508) 271-7110, One Speen Street, Framingham, MA 01701, Fax: (508) 270-3882

METRO NEW YORK
ACCOUNT DIRECTOR: Peter Mayer (201) 634-2324; **ACCOUNT EXECUTIVE:** John Radzniak (201) 634-2323, 650 From Road - 2nd Floor, Paramus, NJ 07652, Fax: (201) 634-9289

SOUTHEASTERN STATES/ ILLINOIS/ MICHIGAN
ACCOUNT DIRECTOR: Lisa Ladle-Wallace (904) 284-4972, 5242 River Park Villas Dr., St. Augustine, FL 32092, Fax: (800) 779-8622; **ACCOUNT EXECUTIVE:** Deborah Crimmings (508) 271-7110, One Speen Street, Framingham, MA 01701, (508) 879-0700, Fax: (508) 270-3882

ADVERTISER'S INDEX

Advanced Micro Devices 30
www.amd.com
American Power Conversion 17*
www.apcc.com
888-289-APCC
Best Practices in Storage 41
www.snwusa.com
Broadcom 14-15
www.gobroadcom.com
Cisco 36/37
www.cisco.com
Computer Associates 2
www.ca.com
EMC 27
www.emc.com
Finisar 47
www.finisar.com
Fuji Storage 39
www.fujifilm.com
Hewlett-Packard Server 7
www.hp.com
IBM Cross Server 43, 45
www.ibm.com
IBM Software 22-23, 58
www.ibm.com
Lawson 24
www.lawson.com
Microsoft Linux 13
microsoft.com/getthefacts
Microsoft Manageability G1-1
microsoft.com/wssystem
Pink Elephant 33
www.pinkelephant.com
Polycom 9
www.polycom.com
SBC Communications 11
www.sbc.com
Software Paradigms International 29
www.spiportal.com
SunGard Availability Services 20/21*
www.sungard.com
Webroot Software 57
www.webroot.com
Xerox Corporation 18,19
1-800-ASK XEROX, ext. LEARN
xerox.com/learn

*Regional Select Edition

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

INTERNATIONAL DATA GROUP

CHAIRMAN OF THE BOARD
Patrick J. McGovern

CEO
Pat Kenealy

COMPUTERWORLD is a business unit of IDG, the world's leading technology media, research and event company. IDG publishes more than 300 magazines and newspapers and offers online users the largest network of technology-specific sites around the world through IDG.net (www.idg.net), which comprises more than 330 targeted Web sites in 80 countries. IDG is also a leading producer of 168 computer-related events worldwide, and IDG's research company, IDC, provides global market intelligence and advice through 51 offices in 43 countries. Company information is available at www.idg.com.

IDG

Have a problem with your Computerworld subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to: **Computerworld, P.O. Box 3500, Northbrook, IL 60065-3500.**

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

ADDRESS CHANGES OR OTHER CHANGES TO YOUR SUBSCRIPTION
All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information that appears on the label, including the coded line.

YOUR NEW ADDRESS GOES HERE: **ADDRESS SHOWN:** ❑ Home ❑ Business

NAME

TITLE COMPANY

ADDRESS

CITY STATE ZIP

OTHER QUESTIONS AND PROBLEMS
It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly, the following toll-free number is available: **(888) 559-7327 Outside U.S. call (847) 559-7322.**
Internet address: cw@omeda.com

COMPUTERWORLD allows advertisers and other companies to use its mailing list for selected offers we feel would be of interest to you. We screen these offers carefully. If you do not want to receive the promotion list please write to the following address - COMPUTERWORLD, Circulation Department, One Speen Street, Framingham, MA 01701.

NAME
TITLE COMPANY
ADDRESS
CITY STATE ZIP

How to Contact COMPUTERWORLD

We invite readers to call or write with their comments and ideas. It is best to submit ideas to one of the department editors and the appropriate beat reporter.

Don Tennant, editor in chief (508) 620-7714

Mitch Betts, executive editor (301) 262-8243

Julia King, executive editor, events (610) 532-7599

DEPARTMENT EDITORS

Craig Stedman, News editor ..... (508) 820-8120

Mike Bucken, assistant News editor ..... (508) 820-8562

Tommy Peterson, Technology editor ..... (508) 620-7729

Kathleen Molymuka, Management editor ..... (508) 820-8118

REPORTERS

Matt Hamblen, networking; mobile/wireless; network/systems management ..... (508) 820-8567

Heather Havenstein, business intelligence; Web services; application development; application server software ..... (919) 233-7776

Thomas Hoffman, IT management and investment issues; careers/labor; energy industry ..... (845) 988-9630

Lucas Mearian, storage; disaster recovery and business continuity; financial services industry ..... (508) 820-8215

Linda Rosencrance, general assignment; transportation and automotive industries ..... (508) 628-4734

Carol Sliwa, Windows; Linux; RFID; retail industry ..... (508) 628-4731

Marc L. Songini, ERP; supply chain; CRM; databases ..... (508) 820-8182

Patrick Thibodeau, enterprise systems; Unix; outsourcing and immigration; antitrust issues ..... (202) 333-2448

Dan Verton, legislation/regulation; homeland security; federal/state government IT; travel industry ..... (703) 321-2277

Jaikumar Vijayan, corporate security/privacy issues; manufacturing industry ..... (630) 978-8390

Todd R. Weiss, general assignment; open-source community; intellectual property issues; messaging/collaboration ..... (717) 394-3850

OPINIONS

Jamie Eckle, Opinions editor ..... (508) 820-8202

Frank Hayes, senior news columnist ..... (503) 252-0100

FEATURES

Ellen Fanning, special projects editor ..... (508) 820-8204

Robert L. Mitchell, senior editor ..... (508) 820-8177

Mark Hall, editor at large ..... (503) 391-1158

Gary H. Anthes, national correspondent ..... (703) 536-9233

Julia King, national correspondent ..... (610) 532-7599

COMPUTERWORLD.COM

Tom Monahan, online director ..... (508) 820-8218

Sharon Machlis, managing editor/online ..... (508) 820-8231

Kan Mingis, online news editor ..... (508) 820-8545

Marian Prokop, online editor at large ..... (508) 620-7717

David Ramel, e-mail newsletter/online editor at large ..... (508) 820-8269

John R. Brillon, associate art director ..... (508) 820-8216

David Waugh, associate art director ..... (508) 820-8142

Peter Smith, Web development manager
Kevin Gerich, Mark Savary, Web developers
Matthew Moring, graphics designer

RESEARCH

Mari Keefe, research manager
Gussie Wilson, research associate

COPY DESK

Michele Lee DeFilippo, managing editor/production ..... (508) 820-8126

Bob Rawson, assistant managing editor/production ..... (508) 271-8015

Mike Parent, Monica Sambataro, senior copy editors
Eugene Demaitre, copy editor

GRAPHIC DESIGN

Stephanie Faucher, design director ..... (508) 820-8235

April O'Connor, associate art director
Julie Quinn, senior designer
Susan Cahill, graphics coordinator
John Klossner, cartoonist

ADMINISTRATIVE SUPPORT

Linda Gorgone, office manager ..... (508) 820-8176

CONTRIBUTING COLUMNISTS

Pimm Fox, Michael Gartenberg, Dan Gillmor, Paul Glen, Barbara Gomolski, Thornton A. May, David Moschella, Bart Perkins, Paul A. Strassmann

CONTRIBUTING WRITERS

Mary Brandel, Russell Kay, Sami Lais, Robert L. Scheier, Steve Ulfelder

GENERAL INFORMATION

TELEPHONE/FAX

Main phone number .... (508) 879-0700
All editors unless otherwise noted below
Main fax number ..... (508) 875-8931
24-hour news tip line... (508) 620-7716

E-MAIL

Our Web address is **www.computerworld.com.**

Staff members' e-mail follows this form: **firstname_lastname@computerworld.com.**

For IDG News Service correspondents: **firstname_lastname@idg.com.**

LETTERS TO THE EDITOR

Letters to the editor are welcome and should be sent to: **letters@computerworld.com.** Include your address and telephone number.

MAIL ADDRESS

PO Box 9171, 1 Speen Street, Framingham, Mass. 01701

SUBSCRIPTIONS/BACK ISSUES

Subscription rates: U.S., $99.99/year; Canada, $130/year; Central and South America, $250/year; all others, $295/year

Phone ..... (888) 559-7327
E-mail ..... cw@omeda.com
Back issues ..... (508) 820-8167

REPRINTS/PERMISSIONS

Contact ..... Renee Smith
Phone ..... (717) 399-1900, ext. 172
E-mail ..... reprints@computerworld.com
Visit **www.reprintbuyer.com** to obtain quotes and order reprints online.

COMPANIES IN THIS ISSUE

Page number refers to page on which story begins. Company names can also be searched at **www.computerworld.com.**

ADVANCED FIBRE COMMUNICATIONS INC. 1
AFFILIATED COMPUTER SERVICES INC. 40
AGITAR SOFTWARE INC. 25
ALACRITUS SOFTWARE 36
ALCATEL 28
AMERICAN INDIAN SCIENCE AND ENGINEERING SOCIETY 32
AMR RESEARCH INC. 1,8
ANITIAN CORP. 1
ARC ADVISORY GROUP INC. 12
ASIANAVENUE.COM 32
ASSOCIATION OF STORAGE NETWORKING USERS 37
ATA AIRLINES INC. 40,42
ATI TECHNOLOGIES INC. 28
AVINTI INC. 8
BANK OF AMERICA CORP. 31
BEGLEY CO. 34
BLACK DATA PROCESSING ASSOCIATION 31,32
BLACKPLANET.COM 32
BLUECROSS BLUESHIELD OF TENNESSEE INC. 4
BMC SOFTWARE INC. 8
BORLAND SOFTWARE CORP. 5
BRENNAN CENTER FOR JUSTICE 25
BROCADE COMMUNICATIONS SYSTEMS INC. 35
BUILDING STORAGE INC. 40
CACI INTERNATIONAL INC. 25
CANVAS SYSTEMS LLC. 40
CERNER CORP. 8
CHELA EDUCATION FINANCING 21
CHILDREN'S MIRACLE NETWORK 31
CIBER INC. 25
CISCO SYSTEMS INC. 4,6,36
COMPUTER ASSOCIATES INTERNATIONAL INC. 6,8,16, 28,36,55
CONSORTIUM FOR GRADUATE STUDY IN MANAGEMENT 32
CONTINENTAL AIRLINES INC. 6,38
CURRENT ANALYSIS INC. 4
CVS CORP. 34
DANTZ DEVELOPMENT CORP. 55
DATA MOBILITY GROUP LLC 38,40
DECISIONONE CORP. 40
DECISIONSMITH 25,26
DELL INC. 36
DELTA AIR LINES INC. 31
DELTA TECHNOLOGY INC. 31
DENVER HEALTH MEDICAL CENTER 37
DIEBOLD ELECTION SYSTEMS 25
E.D. SMITH & SONS LTD. 10
EBAY INC. 19
EDWARD JONES & CO. 38
EEYE DIGITAL SECURITY INC. 55
ELECTION SYSTEMS AND SOFTWARE INC. 25
EMC CORP. 4,36,38,40,55
ENTERPRISE STRATEGY GROUP INC. 4,36,37
EXABYTE CORP. 36
EXECUTIVE SOFTWARE INTERNATIONAL INC. 37
FEDERAL COMMUNICATIONS COMMISSION 56
FEDERAL ELECTION COMMISSION 25
FIRST INTERNET INC. 1
FUJI PHOTO FILM USA INC. 46
GABRIEL CONSULTING GROUP INC. 10
GARTNER INC. 5,34,38
GENERAL ELECTRIC CO. 40
GOLDEN GATE UNIVERSITY 36
HABITAT FOR HUMANITY INTERNATIONAL INC. 31
HART INTERCIVIC INC. 25
HEALTH LANGUAGE INC. 34
HERMAN MILLER INC. 1,16
HEWLETT PACKARD CO. 4,8,40
HITACHI DATA SYSTEMS CORP. 4,40
IBM 4,5,6,8,10, 19,28,40,46
IDC 5,8,10,35,45
INFORMATION SYSTEMS AUDIT AND CONTROL ASSOCIATION 1
INFOSYS TECHNOLOGIES LTD. 8
INTEGRAIL 34
INTEL CORP. 10,28
INTERNET SECURITY SYSTEMS INC. 55
IROQUOIS GAS TRANSMISSION SYSTEM LP 56
IT GOVERNANCE INSTITUTE 1
ITPARADE.COM INC. 40,42
JOHNS HOPKINS UNIVERSITY 25
JUPITER RESEARCH 20
KRYPTONITE 28
LEADERSHIP CONFERENCE ON CIVIL RIGHTS 25
LEFTHAND NETWORKS INC. 37
MARRIOTT INTERNATIONAL INC. 31
MCKESSON PROVIDER TECHNOLOGIES 34
MERCK AND CO. 31
META GROUP INC. 1,8
MICROSOFT CORP. 1,4,5,10, 20,25,28,55
MIGENTE.COM 32
NATIONAL MEDICAL HEALTH CARD SYSTEMS INC. 34
NATIONAL SOCIETY OF BLACK ENGINEERS 31,32
NCR CORP. 6
NEOIT INC. 8
NETWORK APPLIANCE INC. 38
NORTHROP GRUMMAN CORP. 40
NOVELL INC. 6
OAG WORLDWIDE LTD. 6
OBIAN INC. 1
OFFICE DEPOT INC. 12
ONDEMAND PARTNERS LLC 16
ONLINE RESOURCES CORP. 1
OPTWARE CORP. 45
ORACLE CORP. 10,19,38
PAYPAL INC. 19
PEOPLESOFT INC. 12
PORTLAND GENERAL ELECTRIC CO. 16
QUALSTAR CORP. 36
RABA TECHNOLOGIES LLC 25
RATIONAL SOFTWARE CORP. 5
REGIONS FINANCIAL CORP. 4
RELIABLE DRUG STORES INC. 34
RITE AID CORP. 34
SAGE RESEARCH INC. 35
SAP AG 6
SCIENCE APPLICATIONS INTERNATIONAL CORP. 16
SIERRA ATLANTIC INC. 8
SILICON GRAPHICS INC. 28
SOCIETE BIC 28
SOCIETY OF HISPANIC PROFESSIONAL ENGINEERS INC. 31,32
SOUTHWEST AIRLINES CO. 6
STARBUCKS CORP. 4
STORAGE TECHNOLOGY CORP. 40,46
SUCCEED CORP. 5
SUN MICROSYSTEMS INC. 10,20,36,40
SUNGARD DATA SYSTEMS INC. 4,38
SYSTEMCORP ALG LTD. 5
SYSTEMEXPERTS CORP. 25,26
SYSTEST LABS LLC 25
TATA CONSULTANCY SERVICES LTD. 8
TEPPCO PARTNERS LP 38
TERADATA CORP. 6
THE ALLSTATE CORP. 31
THE NEW YORK TIMES CO. 34
THE SAGEZA GROUP INC. 10
THE SCO GROUP INC. 6
THE YANKEE GROUP 35,45
TRUSECURE CORP. 1
U.S. AIR FORCE 36,37
U.S. DEPARTMENT OF JUSTICE 16
U.S. SECURITIES AND EXCHANGE COMMISSION 1,20
UNITEDHEALTHCARE 34
UNIVERSITY OF PITTSBURGH MEDICAL CENTER 8
VERITAS SOFTWARE CORP. 55
WAL-MART STORES INC. 6
WORLD DATA PRODUCTS INC. 40,42
WYLE LABORATORIES INC. 25
WYNDHAM INTERNATIONAL INC. 1
XEROX CORP. 20
XERXES COMPUTER CORP. 40
ZEBRA TECHNOLOGIES CORP. 1

Continued from page 1

Patches

them trickle in randomly throughout the day, week and month."

David Krauthamer, director of information systems at Advanced Fibre Communications Inc. in Petaluma, Calif., said Microsoft appears to have become much more aware of the heavy burden that patching systems puts on IT managers. He added that a regular patching schedule reduces much of the instability that results from intermittent releases and eases the challenge of keeping up to date on patches.

"What it gives you is the consistency you need to factor patching into your overall [systems management] process," Krauthamer said. "It's a great thing if you can spend just one night a month doing patches."

From a systems administration standpoint, the predictability of the monthly releases has made it "much easier" to manage the patching of Windows-based machines, said Mike Tindor, vice president of network operations at First Internet Inc., an Internet service provider in St. Clairsville, Ohio.

Debbie Fry Wilson, director of marketing at Microsoft's Security Response Center, said the shift from an ad hoc patch release process to a weekly schedule and then to the monthly one was driven by feedback from users who said they "were not able to plan well because they didn't know in advance when we would have patches for them."

Deeper Testing

The policy of releasing patches on the second Tuesday of each month has also given Microsoft more time to work on improving the quality of its fixes and to do a "deeper level of testing" in the patch development stage, Wilson said.

Even so, users and analysts cited some ongoing concerns with the patching process.

Microsoft's growing habit of grouping together multiple security fixes in large patches can increase the testing burden for IT managers, said Russ Cooper, an analyst at TruSecure Corp., an IT security consulting firm in Herndon, Va.

For instance, last week's crop of patches included one that was designed to fix eight separate vulnerabilities. "Users should get used to the idea of being snowed under on 'Patch Tuesday,' " Cooper said.

A monthly schedule can sometimes also expose users to longer periods of risk, said Andrew Plato, president of Anitian Corp., a systems integrator and consulting firm in Beaverton, Ore. "If a new security flaw is discovered right after an update, waiting 30 days for a patch is too long," he said.

Tindor said that if information about a security flaw were to become public before the next monthly patch release, he would expect Microsoft to be "proactive in pushing the updates quickly rather than waiting to release them at the scheduled time."

Stephen Toulouse, security program manager at the Microsoft Security Response Center, reiterated that the company is releasing combined fixes in response to requests from users.

"We have heard very clearly from customers that when there is an opportunity to have just one update, that's what they want," Toulouse said, noting that Microsoft tries to combine fixes for multiple flaws found in the same source-code files.

In response to concerns about users being exposed to longer periods of risk, Wilson said Microsoft will issue out-of-cycle fixes if the situation warrants it. In late July, for instance, the company rushed out a patch after an active exploit was found to be taking advantage of a flaw in Internet Explorer. **50113**

Microsoft's Fixes Seek to Stop Remote Attacks

THE FLURRY OF FIXES Microsoft released last week was aimed at plugging nearly two-dozen security holes, the most severe of which could allow an attacker to take complete control of an affected system and remotely execute malicious code.

Four of the newly disclosed vulnerabilities are particularly dangerous because they can be remotely exploited by malicious hackers, according to an advisory issued by Atlanta-based Internet Security Systems Inc.

"What concerns me is that they are taking such a long time in fixing some of these bugs," said Drew Copley, a senior research engineer at eEye Digital Security Inc., a vulnerability management software vendor in Aliso Viejo, Calif.

For instance, one of the flaws disclosed last week was reported to Microsoft 208 days before the patch designed to fix it was issued, according to Copley.

"That's a long time to expect that no one else is going to find out about it," he said.

Stephen Toulouse, security program manager at Microsoft's Security Response Center, said some patches require extensive testing because of the complexity of the vulnerabilities. "One of the most important things is quality," Cooper said.

The total number of flaws disclosed last week came close to matching the 22 security vulnerabilities that Microsoft released fixes for last April.

– Jaikumar Vijayan

EMC Buys Backup Software Vendor

BY LUCAS MEARIAN

EMC Corp. last week agreed to acquire Dantz Development Corp. in an effort to boost sales to the small-business community as the company continues to expand its software portfolio.

EMC officials said that Walnut Creek, Calif.-based Dantz will become part of the Enterprise Storage Software Group. The deal is valued at less than $50 million, according to EMC.

Observers said the acquisition should help EMC in its competition with Veritas Software Corp.'s BackupExec software and Computer Associates International Inc.'s BrightStor ARCserve backup agent.

Mark Lewis, executive vice president of EMC's software group, said the acquisition should allow the company to boost its offerings for small to midsize businesses. In addition, he said, Dantz's backup software should integrate easily with the EMC NetWorker backup management software produced by EMC's Legato division.

Lewis said that Dantz's Retrospect backup software will be sold separately, even after it's integrated with NetWorker.

Kevin Money, network supervisor at Iroquois Gas Transmission System LP, whose operation has been using the Dantz Retrospect software for nine years to back up its workstations, servers and field offices, said he wants to know what EMC's plans are for the Dantz operation.

> **Is [EMC buying Dantz] for its infrastructure, its patents or for its licensing?**
>
> **KEVIN MONEY,** NETWORK SUPERVISOR, IROQUOIS GAS TRANSMISSION

Shelton, Conn.-based Iroquois has 123 employees and operates a 412-mile natural-gas pipeline that runs from the U.S.-Canada border at Waddington, N.Y., to Long Island. Money said his operation has six servers that run the Retrospect software and back up about 2TB of data nightly. The backup application is simple to manage and works across Windows, Macintosh and Linux platforms, he said.

Money also said he likes Dantz's licensing structure, which is based on the number of servers the software is running on, not on the number of individual clients that are being backed up.

He expressed concern about EMC's plans for the Dantz unit. "Is [EMC buying Dantz] for its infrastructure, its patents or for its licensing?" Money said. "The only other thing I'd be questioning that also always makes people like us nervous is just their licensing [plans]."

According to EMC, there are no plans to change the Dantz licensing schemes.

The company said that Dantz will continue to operate out of its Walnut Creek facilities. Current President and CEO Larry Zulch will continue to oversee the Dantz unit and will report to Lewis and Dave DeWalt, co-leaders of EMC's software group. **50108**

Periodical postage paid at Framingham, Mass., and other mailing offices. Posted under Canadian International Publication agreement #40063800. CANADIAN POSTMASTER: Please return undeliverable copy to PO Box 1632, Windsor, Ontario N9A 7C9. Computerworld (ISSN 0010-4841) is published weekly; except a single combined issue for the last two weeks in December by Computerworld, Inc., 1 Speen Street, Box 9171, Framingham, Mass. 01701-9171. Copyright 2004 by Computerworld Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased from the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3 per copy of the article, plus 50 cents per page, is paid directly to Copyright Clearance Center, 27 Congress St., Salem, Mass. 01970. Reprints (minimum 100 copies) and permission to reprint may be purchased from Renee Smith, Computerworld Reprints, c/o Reprint Management Services, Greenfield Corporate Center, 1808 Colonial Village Lane, Lancaster, Pa., 17601; (717) 399-1900, Ext. 172. Fax: (717) 399-8900. Web site: www.reprintbuyer.com. E-mail: reprints@computerworld.com. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $5 per copy; U.S. – $99.99 per year; Canada – $130 per year; Central & So. America, $250 per year; Europe – $295 per year; all other countries – $295 per year. Subscriptions call toll-free (888) 559-7327. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, PO Box 3500, Northbrook, Ill. 60065-3500.

BPA ABM RED TAG

FRANK HAYES ■ FRANKLY SPEAKING

IT in a Jam

IN FRANCE LAST WEEK, it became legal for movie theaters to use electronic jammers to block cell phone use during shows. In Mexico, some churches recently started doing the same thing during religious services, even though jammers are illegal there. Police in the U.S. use them too, especially during hostage standoffs. That's a violation of federal law, but the FCC has never taken anyone to court over it. Prisons, the Secret Service, the military — the list of jammer users keeps getting longer.

Hey, if they're using jammers to solve their problems, why can't *we* use them to deal with the security issues created by cell phones, Wi-Fi and other wireless technologies?

It sure would make things easier for us. Instead of constantly monitoring networks to look for Wi-Fi hubs that users have smuggled in, we could just shut them down with a jammer. We could block cell phones in conference rooms and jam camera-equipped phones in sensitive areas like research labs (and restrooms). Everything from surveillance bugs to Bluetooth devices could be shut down at once by turning whole office buildings into dead zones.

Yes, we'd be rolling things back to the pre-wireless days. But that means we'd dump all the problems wireless has brought us, from network security holes to the time employees waste on nonbusiness cell calls. And since most of those wireless gizmos are personal, not issued by the company, we wouldn't be losing official IT infrastructure — just shedding annoying complications that users have dragged in.

It's technology applied to eliminate problems introduced by technology. So why shouldn't we use jammers?

Well, they *are* illegal. Maybe the FCC isn't actively looking for violators, but if you blast away with a jammer in the same location long enough, you'll probably get caught.

Then there are the side effects. Never mind users whining about emergency calls they might not get; they got messages about emergencies before they had cell phones, and they can do that now, too.

But delivery and repair people depend heavily on wireless technologies these days. Your building security guards use radios; so do police and firefighters. Broad-spectrum jamming would cut them all off. Jamming would likely affect your neighbors, too, because there's no cheap way to limit the effects of a jamming signal — it won't stay inside your office walls.

Of course, you could limit your jamming to just Wi-Fi's 2.4-GHz band and spend extra for smart jammers that fool cell phones into thinking they're local towers that have run out of bandwidth. Or you could line your office and conference room walls with radioproof material that lets you use Wi-Fi and Bluetooth locally while blocking would-be wireless hijackers and without annoying the people next door — and that approach is legal, too.

Pile on enough antiwireless technology, and you might even be able to block just the things you want blocked. Wouldn't that be great?

No, it wouldn't.

Maybe movie theaters and churches can roll back wireless. Maybe cops and the Secret Service have to create wireless-free zones. We can't — any more than we could roll back the Internet or LANs or PCs when users first brought them in.

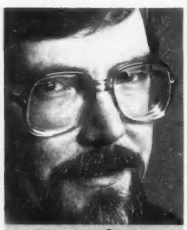
Sure, wireless will give us security headaches for a long time. But users have forced us to deal with cell phones, Wi-Fi and the rest. They've forced wireless on us because it's useful to them, even if it's an ongoing pain for us.

We can — and should — use vigilance, education and occasional arm-twisting to plug security holes and keep users from straying too far from what we can handle.

But there's no use in wishing for ways to jam or block or limit wireless technology. Not now, not anymore. Users are right — for IT, in many ways, the future is wireless.

And we can't jam the future.

50066



FRANK HAYES, *Computerworld*'s senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

Rain, Rain, Go Away

When hurricane season arrives, this pilot fish in Florida isn't worried. The disaster recovery plan is in place. Backups are done. The new generators are fueled. And when a storm hits, everything keeps running – except that it's pretty dark in the data center and the IT staff is monitoring the servers by flashlight. "Did the bulbs blow when the power surged back on? Or maybe the breaker tripped?" fish asks. "No – further investigation revealed that no one had bothered to wire the lighting into the generator."

Sog Story

It's the early 1980s, and this company is moving to a new data center – which is a major undertaking for the one department that still keeps all its data on punch cards and refuses to copy it to tape. "The department head told us he planned to move his many filing cabinets worth of card drawers by hiring a flatbed truck," says an IT pilot fish. "Then the data center manager asked one question: 'What happens if it's raining that weekend?' The department head got a blank look on his face as his jaw started its trip to the floor. The data was moved to disk by the end of the week."

You Said Bring Back All the Computers

This big hospital is shutting down a remote physical therapy office, but the outpatient clinic at the same site will stay open. So after this pilot fish sends two newly hired PC techs to collect the therapy office's computers, he's a little concerned when the connection to the clinic drops off. Maybe it's a power outage from this thunderstorm, he figures. "Hours later, I begin to cry when the techs return and start unloading the equipment: monitors, PCs, mice, keyboards – and then the router, switch and complete patch panel with a spaghetti of cut wires out the back," fish says. "'Why in @#$%! did you remove the networking equipment?' I ask. Then I remember the network closet was located in the therapy office."

Whatever Works

This Gulf Coast facility is big, but it's a long way from the big city – or a really big network connection. So, what's the plan for protecting data when a hurricane strikes? consultant pilot fish asks IT manager. Manager replies, "Because we're so far from any real bandwidth, when we see a hurricane coming, we call everybody on the campus and tell them to make a full backup of their data and bring it to the designated trailer. Once everyone is accounted for, we put all the tapes in my pickup truck and drive north for a few days."

DRIVE BY WITH YOUR STORY. Send me your true tale of IT life at **sharky@computerworld.com**. You score a snazzy Shark shirt if I use it. And check out the daily feed, browse the Sharkives and sign up for Shark Tank home delivery at **computerworld.com/sharky**.

DON'T UNDERESTIMATE SPYWARE.

webroot®
Spy Sweeper™
Enterprise

It is one of the biggest threats to your enterprise today. Spyware steals bandwidth, halts productivity and puts your intellectual property in harm's way. Webroot Spy Sweeper Enterprise offers real-time protection by identifying and eradicating spyware across your organization. **To see the magnitude of the spyware threat, run a free network scan at www.webroot.com/whoaboy or contact us at 866.254.5914**

webroot®
SOFTWARE, INC.

DB2 DOESN'T LOCK YOU IN. YET ANOTHER REASON WHY DB2 IS THE WORLD'S LEADING DATABASE PLATFORM.

DB2 is middleware, but it is anything but middle-of-the-road. In fact, DB2 is the leading database built on and optimized for Linux,® UNIX® and Windows,® built to take full advantage of your existing heterogeneous and open environments, which enable true grid computing.

Plus, there's no constricting contract.

It's also middleware with an eye on your resources. All of them. An ITG study showed overall costs for Oracle are up to four times higher than DB2. Solitaire claims that, on average, Oracle required 25% more time to manage than DB2. And tpc.org rates DB2 as the overall price/performance leader for TPC-C on Linux, UNIX and Windows. Ahead of both Oracle and Microsoft® SQL Server.*

Then there's this: Oracle will drop the current level of support for Oracle 8i at the end of 2004. Meaning limited support, higher cost or a complete migration to current versions of Oracle.

Fortunately, IBM offers ongoing, around-the-clock service and support for DB2. And DB2 is also highly scalable, flexible and easy to manage, requiring no newfangled skill sets.

Why not move up to middleware that makes sense? Through the end of the year, you can get IBM DB2 Universal Database by taking advantage of our extremely compelling trade-up promotion. Visit **ibm.com**/db2/swap today to find out if you qualify. And free yourself.

IBM

ON DEMAND BUSINESS™

IBM, the IBM logo, DB2 and the On Demand logo are trademarks or registered trademarks of International Business Machines Corporation in the United States and other countries. Linux is a registered trademark of Linus Torvalds. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries. UNIX is a registered trademark of The Open Group in the United States and/or other countries. Other company, product and service names may be trademarks or service marks of others. © 2004 IBM Corporation. All rights reserved. *All referenced results current as of 09/28/04. Linux: DB2 UDB v8.1: 1.61 US$/tpmC, 18,661 tpmC, available 12/15/04, vs Oracle 10g : 3.94 US$/tpmC, 136,111 tpmC, available 03/05/04. UNIX: DB2 UDB v8.1: 4.95 US$/tpmC, 809,144 tpmC, available 09/30/04, vs Oracle 10g : 5.26 US$/tpmC, 371,044 tpmC, available 09/30/04, Windows: DB2 UDB v8.1: 1.68 US$/tpmC, 18,318 tpmC, available 04/14/04, vs Microsoft SQL Server 2000: 1.85 US$/tpmC, 22,052 tpmC, available 02/18/04, vs Oracle 10g : 4.98 US$/tpmC, 291,413 tpmC, available 10/25/04. TPC Benchmark, TPC-C and tpmC are trademarks of the Transaction Processing Performance Council. For further TPC-related information, please visit http://www.tpc.org.